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DEPARTMENT OF THE INTERIOR
FRANKLIN K. LANE, Secretary

SIXTEENTH ANNUAL REPORT

OF THE

RECLAMATION SERVICE

1916–1917

ARTHUR P. DAVIS, Director and Chief Engineer
WILL R. KING, Chief Counsel

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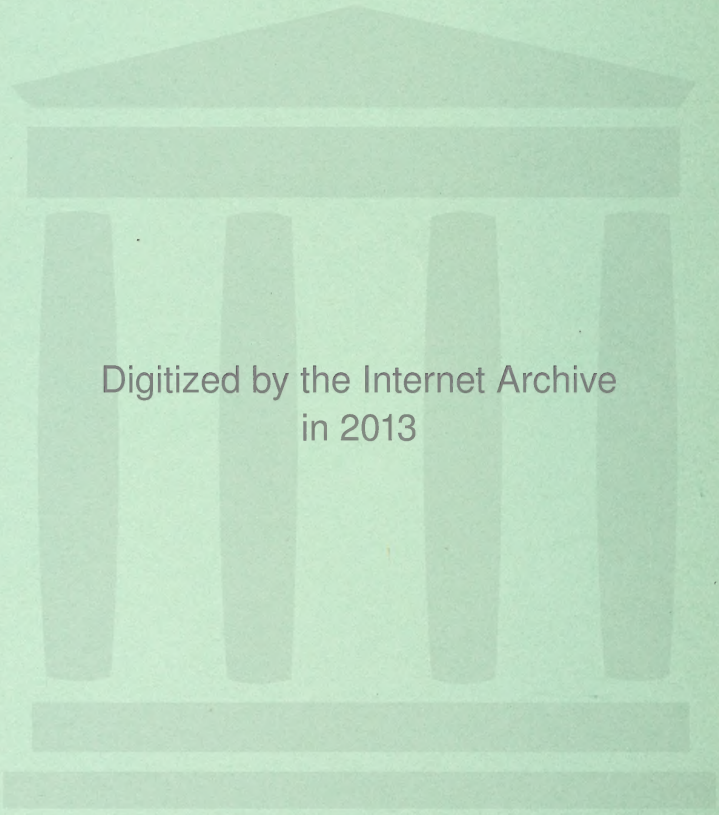

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ANNUAL REPORTS OF THE RECLAMATION SERVICE.

[Reports may be purchased from superintendent of documents, Government Printing Office, at the prices given.]

I. June 17 to Dec. 1, 1902; 317 pages, 46 plates, 65 figures, case of drawings. Out of print.

II. Through the field season of 1903; 550 pages, 49 plates, 56 figures. Cloth, 85 cents.

III. Through the field season of 1904; 653 pages, 59 plates, case of drawings. Cloth, $1.25.

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XIII. Fiscal year, 1913–14; 514 pages. Cloth, 45 cents; paper, 30 cents.

XIV. Fiscal year 1914–15; 521 pages. Cloth, 45 cents; paper, 30 cents.

XV. Fiscal year 1915–16; 808 pages. Cloth, 75 cents; paper, 60 cents.

XVI. Fiscal year 1916–17; 598 pages. Cloth, 65 cents; paper, 50 cents.

A price list of publications issued by the Reclamation Service can be obtained by application to the Director and Chief Engineer, United States Reclamation Service, Washington, D. C.

The monthly bulletin of the service, the "Reclamation Record," is issued about the first of each month. It contains usually 48 pages of general news and notes of interest about the projects. The subscription price is 50 cents per year.

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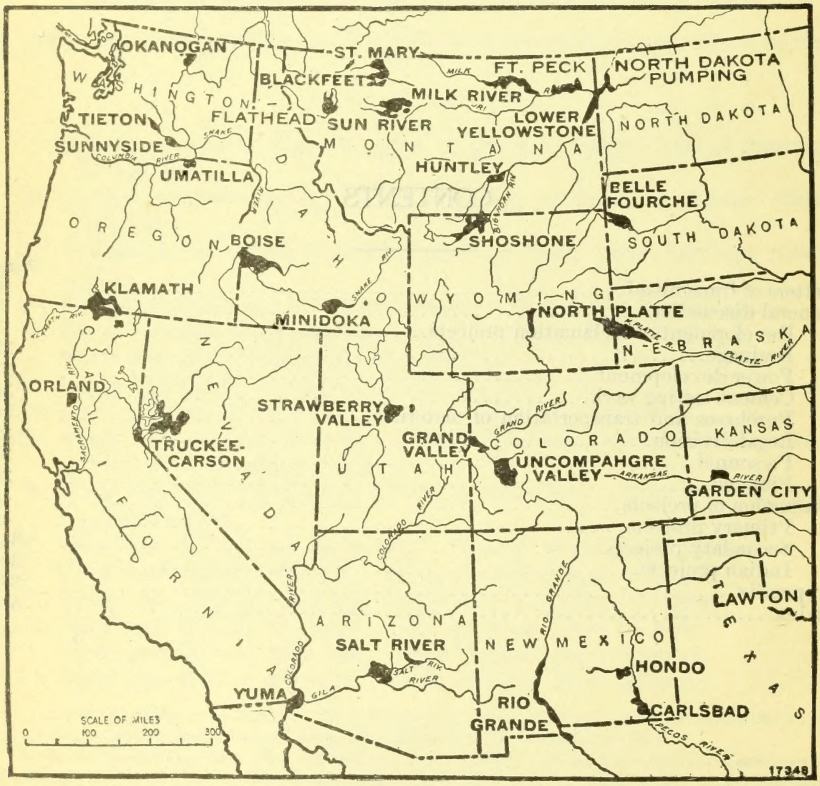

PRINCIPAL RECLAMATION SERVICE PROJECTS IN THE WESTERN UNITED STATES.

LETTERS OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
Washington, December 5, 1917.

SIR: In compliance with the provisions of section 2 of the act approved June 17, 1902, entitled "An act appropriating the receipts from the sale and disposal of public lands in certain States and Territories to the construction of irrigation works for the reclamation of arid lands," I have the honor to transmit the Sixteenth Annual Report of the Reclamation Service.

Respectively,

FRANKLIN K. LANE, *Secretary.*

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES.

DEPARTMENT OF THE INTERIOR,
UNITED STATES RECLAMATION SERVICE,
Washington, D. C., September 11, 1917.

SIR: Transmitted herewith is the Sixteenth Annual Report of the Reclamation Service, covering the work completed and in progress during the fiscal year ended June 30, 1917.

Very respectfully,

A. P. DAVIS,
Director and Chief Engineer.

THE SECRETARY OF THE INTERIOR.

SIXTEENTH ANNUAL REPORT

OF THE

RECLAMATION SERVICE.

GENERAL DISCUSSION.

DEVELOPMENT OF RECLAMATION PROJECTS.

INCREASE IN CULTIVATION.

More than usual progress in the utilization of the works of the Reclamation Service has been made during the fiscal year ending June 30, 1917. Not only has the actual number of settlers and of homes increased, but a greater increase is shown in the area actually irrigated and cropped, and in the value of the crops produced The progress is shown in the following table:

Year.	Irrigable acreage.	Irrigated acreage.	Irrigated farms.	Cropped acreage.	Crop value.
1909	730,000	382,000	9,000	.....	.....
1910	880,000	475,000	12,000	415,000	$12,500,000
1911	1,015,000	560,000	14,000	470,000	13,000,000
1912	1,160,000	645,000	15,000	590,000	14,500,000
1913	1,200,000	700,000	16,000	650,000	16,000,000
1914	1,250,000	770,000	18,000	700,000	16,500,000
1915	1,500,000	857,000	20,000	800,000	19,000,000
1916	1,600,000	1,010,000	23,000	925,000	35,000,000

The area irrigated in 1916 and the value of the crops raised thereon show a very large contribution to the agricultural products of the country, which has been greatly increased in the season of 1917 as a result of increased acreage served, a larger proportion cultivated, and higher crop values. Similar increases are expected for the immediate future.

PRINCIPAL OPERATIONS DURING THE YEAR.

The principal construction operations at present are drainage works, which are in progress on a number of the projects. Irrigation construction proper is confined mainly to the extension and completion of existing distribution systems, the chief exceptions being the construction of a large storage reservoir on the Tieton River in Washington, and the construction of the Fort Laramie unit on the North Platte project, Wyoming and Nebraska.

The principal activities of the Reclamation Service, however, are the operation and maintenance of systems that have been built and

are delivering water to agricultural lands. The policy of turning this operation over to the water users, authorized by the reclamation extension act, is being followed wherever they are willing and able to undertake it. The only places where this has been actually carried into effect are on the north side of the Minidoka project and on some new irrigation districts recently organized on the Yakima project.

No new projects have been commenced during the fiscal year. The Lawton project in Oklahoma, which has been under investigation for several years and authorized under certain conditions, received an appropriation for the fiscal year 1917 of $51,000. An executive condition was imposed that the lands to be irrigated should be formed into an irrigation district competent to contract for irrigation works in accordance with the reclamation laws. This condition was fulfilled and the contract was about to be signed and construction commenced when the needs of the Fort Sill military post for an increased water supply led to a change of plans and work was stopped at the request of the inhabitants of Lawton and vicinity. The project may come up for later consideration after the war if the military needs should be then reduced.

The Salt River project, Arizona, was the second project authorized under the reclamation law, and was one of the first upon which construction began. Over $10,000,000 has been invested there from reclamation funds, and one of the great reservoirs of the world has been constructed on the Salt River to store the floods of that river and its tributaries, holding more than two years' supply for the lands to be irrigated. A concrete diversion dam with canal headings on both banks and a large and intricate canal system have been provided from which water for irrigation has been delivered by the United States for over eight years. During this time there has been no water shortage, and the works are in an excellent state of efficiency. Large power developments have been carried out as an adjunct to this project, and besides furnishing a large amount of power for pumping upon the project, are producing a gross revenue from commercial power of over $300,000 per annum, which under the operation of the law are credited to the project.

The irrigable lands as a whole are very fertile and remarkably convenient for irrigation, having a good slope for the transportation of water, requiring very little leveling, and producing large results in proportion to labor expended. It is one of the most productive and wealthiest projects of the service.

This project has been practically completed for three or four years, the reservoir having been completed in 1910. In January, 1917, public notice was issued requiring repayment of the Government investment, in accordance with the provision of law, in 20 years by the beneficiaries in small annual installments beginning December 1, 1917. Vigorous protest against this requirement was made by the water users, and after considerable discussion and negotiation an offer was made to the water users' association by which the receipts from power would be credited upon the annual accruals of construction charges instead of being credited to the project as a whole. A contract embodying this provision was submitted to a vote of the water users and accepted by a vote of 48,883 against 3,100. Under its provisions the receipts from the power plant will be sufficient to pay all the construction charges for seven or eight

years and more than half of the charges for the balance of the period of payment. The immense advantages of such a contract are appreciated by the leading men of the valley, and it is expected that the acceptance of the contract will end the controversy over payments, at least for several years.

On the Yuma project, Arizona and California, water is now available for all the irrigable lands included in the project which can be irrigated by gravity, and public notice has been issued, the first payment falling due December 1, 1917. Work is in progress in the revetment of the levees with rock to protect this valley from attack by the Colorado River. Drainage works on the Arizona side are also in progress.

The Orland project, California, has been practically completed with the exception of a small amount of canal lining and some provision for the care of waste water. Public notice was issued in 1916 and the first payment was made in full on the day it fell due by a check from the water users' association which assumes all liability and inconveniences from delinquencies and defaults. This illustrates the cordial cooperation that has always existed upon this project.

The Grand Valley project, Colorado, is under construction. The main canal has been nearly completed; this and the main laterals are being tested and primed and water has been delivered to about 4,000 acres during 1917 on a rental basis. The completion of the lateral system is being held in abeyance pending the settlement of lands already under canals and an effective demand for further extension.

The Uncompahgre Valley project, Colorado, is completed to the extent that water can be delivered to about 100,000 acres of land, about one-half of which has been irrigated and cropped for several years. The issue of public notice covering these lands has, however, been postponed at the request of the water users.

The Boise project, Idaho, has in the main been completed, although two large extensions are contemplated for early construction. Arrowrock Dam regulates the flow of the Boise River and stores about 250,000 acre-feet of water, which is diverted about 18 miles below and carried in a large canal to irrigate lands in the upper valley and to discharge a large percentage of its water into the reservoir far down the valley known as Deer Flat Reservoir, for storage for lands farther down. The water supply as thus regulated is capable of supplying from 20,000 to 30,000 acres of land not yet reached by canals. Land under canals amounting to about 220,000 acres can be served with water and public notice has been issued announcing construction charges, the first installment of which falls due December 1, 1917.

The Minidoka project, Idaho, has in the main been completed, although it is susceptible of several extensions. The gravity portion of the project has been making payments under public notice for several years, and the South Side or pumping project has also recently begun payments under public notice. The gravity portion has been formed into an irrigation district which has taken over the operation and maintenance of the system under contract authorized by the reclamation extension act.

The enlarging of Jackson Lake Reservoir under contract with the Kuhn Irrigation & Canal Co. and Twin Falls Canal Co. has been

completed, and provides for the storage of water for the North Side and South Side Twin Falls tracts.

The Huntley project, Montana, will require the building of additional laterals to serve properly the new lands in the eastern part of the project. Drainage work is also in progress on this project.

The Milk River project, Montana, is under construction. The feed canal from St. Mary River to Milk River, which will furnish irrigation water for the Milk River Valley, has been completed and the work of seasoning and priming has been prosecuted. Some water has been delivered during the past summer for irrigation in Milk River Valley. The diversion of Swift Current Creek into St. Mary Lake has been completed, and work is under way on the Sherburne Lakes Dam to store the water of Swift Current Creek for use in the Milk River Valley. The Vandalia Diversion Dam has been in operation and furnishing water for the canals at that point. Water is being stored in the Nelson Reservoir, which receives it from the Dodson South Canal.

The Sun River project, Montana, is under construction. Irrigation has been continued on the Fort Shaw unit on the south side, and the main canals and laterals on the north side are being primed ready for use. This is difficult work, but it is probable that some water can be delivered for irrigation in 1918.

On the North Platte project, Nebraska and Wyoming, the south side or Fort Laramie unit is being constructed. The heavy work on the first 30 miles of the main canal is well advanced and mostly completed or contracted. Some lands can be irrigated in 1918 from this canal.

On the Truckee-Carson project, Nevada, water is being stored in Lahontan Reservoir and Lake Tahoe, and delivered for irrigation. A movement is on foot to form an irrigation district of this project for the purpose of facilitating the construction of drainage works and for other purposes.

On the Carlsbad project, New Mexico, the principal work in progress is drainage work. Construction repairs required by the damage done by floods to the old spillway in 1915 have been completed, but to carry out this work it was necessary to draw down the reservoir and this caused some embarrassment from water shortage in 1917 which was an exceptionally dry year.

The Rio Grande project, New Mexico and Texas, is under construction. The Percha diversion dam and the canal system in the Rincon Valley are being constructed. An irrigation district has been formed in Texas and one is being formed in New Mexico to carry through drainage work.

The North Dakota pumping project is being operated only to the extent of the power plant, which is delivering power under contract to the city of Williston. Steps are being taken by the landowners to organize an irrigation district under which it is hoped to provide for the operation of the pumping system.

On the Umatilla project, Oregon, construction has been pushed on the west extension upon which it is now possible to deliver water to most of the land. The entire canal system will be lined with concrete, and this is nearly completed. Water is being delivered on a rental basis to the west extension.

On the Klamath project, Oregon and California, lands uncovered by the lowering of Tule Lake are under public notice and water is being delivered to them as well as to the old lands of the project. Surveys and negotiations have been made looking to the possible development of the Pine Grove and Sand Hollow units in cooperation with the land owners. The development of Lower Klamath Marshes is being prosecuted by the land owners who have formed a drainage district.

On the Yakima project, Washington, construction of the storage dam at Lake Keechelus has been practically completed. Construction has begun on a large reservoir on the Tieton River, a tributary of the Naches. Pumping plants have been built for Outlook, Snipes Mountain, and Grandview irrigation districts.

On the Shoshone project, Wyoming, construction has been pushed in the development of additional lands in the Frannie unit. A large area of this will be opened under public notice this year, and water has been delivered to some of these lands in 1917. Settlement is following closely upon the construction of irrigation works, and the project is prosperous and promising.

SUMMARY OF CONSTRUCTION RESULTS.

The following table gives in concise form many of the items which have been accomplished:

Summary of construction results, June 30, 1917.[1]

Items.	To June 30, 1917.		To June 30, 1916.		Increase.	
LANDS.						
Estimated area of projects on completion	*Acres.* [2]3,072,795	*Farms.* 62,451	*Acres.* 3,117,862	*Farms.* 60,367	*Acres.* −45,067	*Farms.* 2,084
Estimated area to which service was prepared to supply water	1,797,811	37,719	1,690,244	34,826	107,567	2,893
Under contract:						
Water rights	597,631	12,724	542,960	11,536	54,671	1,188
Rental contracts, etc	778,308	16,410	764,743	15,882	13,565	528
Total	1,375,939	29,134	1,307,703	27,418	68,236	1,716
	Acre-feet.		*Acre-feet.*		*Acre-feet.*	
Reservoir capacity available	9,193,800		9,035,160		168,640	
CANALS, DITCHES, AND DRAINS.						
	Miles.		*Miles.*		*Miles.*	
Canals over 800 second-feet capacity	401		382		19	
Canals 301 to 800 second-feet capacity	665		664		1	
Canals 50 to 300 second-feet capacity	1,678		1,580		98	
Canals less than 50 second-feet capacity	7,226		6,891		335	
Total canals	9,970		9,517		453	
Waste-water ditches	456		422		34	
Drains, open	575		492		83	
Drains, closed	149		120		29	
Total	1,180		1,034		146	
Grand total	11,150		10,551		599	
TUNNELS.						
Number	94		89		5	
Length.....feet	141,987		133,333		8,654	

[1] Includes data on Indian projects.
[2] Including areas furnished temporary water supply.
[3] Decrease due to revision of estimates.

Summary of construction results, June 30, 1917—Continued.

Items.	To June 30, 1917.		To June 30, 1916.		Increase.	
STORAGE AND DIVERSION DAMS.						
	Cubic yards.		*Cubic yards.*		*Cubic yards.*	
Masonry	2,083,376		2,071,372		12,004	
Earth	9,818,103		9,684,493		133,610	
Rock fill and crib	1,155,763		984,138		171,625	
Total	13,057,242		12,740,003		317,239	
DIKES AND LEVEES.						
	Miles.	*Cubic yards.*	*Miles.*	*Cubic yards.*	*Miles.*	*Cubic yds.*
Length and volume	94.5	4,430,190	92.8	4,190,106	1.7	240,084
	Concrete.	Wood.	Concrete.	Wood.	Concrete.	Wood.
CANAL STRUCTURES.						
Costing over $2,000	902	134	838	129	64	5
Costing $500 to $2,000	1,866	430	1,633	395	233	35
Costing $100 to $500	7,946	4,794	7,197	4,383	749	411
Costing less than $100	13,754	51,617	9,980	48,008	3,774	3,609
Total	24,468	56,975	19,648	52,915	4,820	4,060
	Number.	Length.	Number.	Length.	Number.	Length.
BRIDGES.						
		Feet.		*Feet.*		*Feet.*
Steel	104	7,002	98	6,325	6	677
Combination	412	11,924	389	11,439	23	485
Wood	4,966	108,226	4,397	94,736	569	13,490
Concrete	335	4,174	300	3,899	35	275
Total	5,817	131,326	5,184	116,399	633	14,927
CULVERTS.						
Concrete	1,654	80,371	1,381	68,745	273	11,626
Metal	1,346	48,977	1,270	44,437	76	4,540
Terra cotta	920	44,339	796	36,596	124	7,743
Wood	3,068	69,346	2,979	67,147	89	2,199
Total	6,988	243,033	6,426	216,925	562	26,108
PIPE.						
	Linear feet.		*Linear feet.*		*Linear feet.*	
Concrete	556,918		520,447		36,471	
Metal	239,400		215,791		23,609	
Terra cotta (tile)	1,046,770		857,103		189,667	
Wood	331,380		280,270		51,110	
Total	2,174,468		1,873,611		300,857	
	Number.	Length.	Number.	Length.	Number.	Length.
FLUMES.						
		Feet.		*Feet.*		*Feet.*
Concrete	76	14,870	69	11,544	7	3,326
Metal	674	142,084	483	123,248	191	18,836
Wood	1,679	362,134	1,618	353,932	61	8,202
Total	2,429	519,088	2,170	488,724	249	30,364
	Concrete.	Wood.	Concrete.	Wood.	Concrete.	Wood.
CANALS LINED.						
Length.....miles	296.9	4.1	241.0	3.9	55.9	0.2
BUILDINGS.						
Offices.....number		79		76		3
Residences.....do		566		548		18
Power plants.....do		26		25		1
Pumping stations.....do		67		67		0
Barns, storehouses, etc.....do		446		412		34
Total		1,184		1,128		56

Summary of construction results, June 30, 1917—Continued.

Items.	To June 30, 1917.		To June 30, 1916.		Increase.	
	Number.	Depth.	Number.	Depth.	Number.	Depth.
WELLS.						
Number and depth	391	*Feet.* 34,583	371	*Feet.* 29,612	20	*Feet.* 4,971
COMMUNICATIONS.						
		Miles.		*Miles.*		*Miles.*
Roads		902		865		37
Railroads		83		83		0
Telephones		2,822		2,629		193
Transmission lines		442		438		4
POWER DEVELOPED.						
Water and steam.....horsepower		47,361		47,311		50
EXCAVATION.						
		Cubic yards.		*Cubic yards.*		*Cubic yards.*
Class 1, earth		133,043,727		124,277,054		8,766,673
Class 2, indurated material		8,882,812		8,382,543		500,269
Class 3, rock		7,859,995		7,478,669		381,326
Total		149,786,534		140,138,266		9,648,268
RIPRAP.....cubic yards		1,527,920		1,297,826		230,094
PAVING.....square yards		749,395		708,022		41,373
CONCRETE.....cubic yards		2,942,775		2,860,149		82,625
CEMENT.....barrels		2,741,763		2,712,998		28,765

PROSPERITY OF WATER USERS.

Prosperity on the various projects is generally and rapidly increasing. This is due not only to the increased prices for farm products, but also in some degree to the favorable terms of repayment provided by the reclamation extension act, which leave the earnings mainly in the hands of the farmers for some years. It is also enhanced by better farming on most projects due to the increased knowledge and skill of the cultivators.

On most projects the water users have appreciated the generosity of the United States Congress in providing liberal terms of repayment. They have bent their energies to putting their farms in shape and are earnestly cooperating with the Reclamation Service in making the projects a success in operation and correcting defects and deficiencies as they develop.

The high level of prices for the 1916 crops has done much to ease the financial difficulties of many settlers, and the prospects for even higher prices for 1917 crops promise to put the irrigation farmers in position to readily discharge current liabilities to the Government.

The excellent work of the Department of Agriculture through its experts in animal husbandry has continued throughout the year, and, assisted by these specialists, settlers are becoming more firmly established in live-stock handling. A number of cooperative live-stock selling associations have been organized and operated with profit to the members, the same organizations being utilized in the purchase of stock of good quality.

The enactment of the Federal farm loan law, providing long-time loans at low interest rates, has held out much hope to project land holders, although, owing to the existing lien held by the Government to secure payment of the building cost of the project works, no arrangement has yet been perfected whereby project settlers may secure loans under this law. It is highly important that such an

arrangement be perfected if the irrigated lands under Government projects are to keep pace with other lands where there is no hindrance to the application of the loan act. There is inclination on the part of money lenders to take advantage of the refusal of the Federal Farm Loan Board to loan on project lands and use it as an excuse for increased interest rates for private or corporation money.

OPERATION AND MAINTENANCE.

The operation and maintenance of the project irrigation works have been carried on during the fiscal year with more general satisfaction to all concerned than during any preceding year. This has been due to the increased experience of both project officials and water users, as well as to the seasoning of the canals and structures through increased use.

There still remains the necessity for classification of soils on a number of the projects as a basis for more equitable schedules of operation and maintenance charges, although, owing to changing conditions, it it is not expected that classifications of soils when once made will remain constant.

The inclination of the landowners to operate and maintain the project works is becoming pronounced. A notable case is that of the gravity unit of the Minidoka project, where the water users' association has arranged to take active charge of the operation and maintenance work.

During the winter three important operation and maintenance conferences were held at Boise, Idaho; Phoenix, Ariz.; and Fort Collins, Colo. In these conferences the technical or engineering side of the operation and maintenance work was not emphasized, but the various officers were given opportunity to discuss subjects more pressing with the irrigationists, closely following agricultural lines.

The good influence of the RECLAMATION RECORD, which is published monthly by the Reclamation Service and sent to each water user, is very apparent, and this publication should by all means be continued.

One good effect of the establishment of the central field office in Denver is the more frequent interchange of ideas between employees throughout the service, which tends to get better results and save expense in many cases. Of particular advantage in this connection is the interchange of ideas between projects with respect to methods of applying irrigation water to crops. It has been found by practice that furrow irrigation will give good results under certain conditions in any part of the country, as will the flooding, the border, or the check system. Formerly each section of the country was inclined to adhere closely to the methods first put into practice.

THE SETTLEMENT SECTION.

The work of the settlement section is under the jurisdiction of the statistician, and includes publicity, photography, and settlement work in the Washington and Chicago offices.

Publicity is obtained by daily bulletins for the press, special stories prepared for syndicate and magazine writers and others, lectures illustrated by stereopticon and motion pictures, the loaning of illustrated lectures, and attractive exhibits at fairs, expositions, etc.

As a result of this publicity work, letters of inquiry are received ranging in number from 500 to 5,000 per month, and many homeseekers call in person, especially at the Chicago office, for information.

The settlement section also cooperates with the various water users' associations on the projects, chambers of commerce, boards of trade, railroads, and State immigration agents in securing competent settlers, and in so far as it is proper under the law assists in disposing of excess lands held in private ownership on the projects. This activity not only assists in securing reliable settlers but safeguards the homeseekers from unscrupulous land agents. Encouragement and assistance are given in improving economic and social conditions, and through the cooperation of the Department of Agriculture and other departments of the Government much valuable data are made available for the settlers on the Government projects.

Settlement data for reclamation projects, 1917.

State and project.	Towns.		Total population of farms and towns.	Number of public schools.	Number of churches.	Banks.			
	Number.	Population.				No.	Capital stock.	Deposits.	Number of depositors.
Arizona, Salt River	14	32,350	54,350	60	50	11	$1,162,000	$10,368,619	.....
Arizona-California, Yuma	5	5,350	7,550	17	9	4	180,000	1,150,000	3,700
California, Orland	1	1,550	3,450	8	7	2	141,000	755,000	2,420
Colorado, Grand Valley	[1] 6	[1] 10,800	11,200	[1] 24	[1] 28	[2] 7	[2] 387,000	[2] 2,484,761	[2] 7,260
Colorado, Uncompahgre Valley [2]	3	6,700	11,103	26	27	8	360,000	2,750,000	8,100
Idaho:									
Boise	10	34,750	47,950	24	52	15	1,800,000	11,500,000	[3] 25,000
Minidoka	6	4,500	11,128	21	25	6	165,000	2,522,764	7,350
Montana:									
Huntley	8	610	2,490	8	6	4	85,000	498,000	1,375
Milk River	6	[3] 5,000	[3] 5,600	14	15	10	375,000	3,238,000	9,156
Sun River	3	[3] 200	[3] 800	4	3	1	20,000	95,000	310
Montana-North Dakota, Lower Yellowstone	8	2,575	3,414	19	5	10	330,000	2,352,000	6,390
Nebraka-Wyoming, North Platte	7	[3] 8,000	[3] 12,200	39	25	16	352,000	[3] 2,400,000	[3] 7,000
Nevada, Truckee-Carson	4	1,600	3,700	18	9	2	130,000	371,240	775
New Mexico:									
Carlsbad	4	3,300	3,934	7	8	3	225,000	1,243,316	2,138
Hondo	1	7,500	7,601	3	9	4	350,000	2,500,000	.....
New Mexico-Texas, Rio Grande	25	87,000	98,000	52	90	19	3,251,000	31,000,000	50,000
North Dakota, North Dakota pumping:									
Williston unit	2	5,300	5,490	6	6	4	235,000	1,800,000	3,500
Buford-Trenton unit	2	425	495	3	2	2	20,000	120,000	250
Oregon, Umatilla	5	1,250	2,350	7	9	1	25,000	157,000	963
Oregon-California, Klamath	4	[3] 5,700	[3] 7,310	20	9	3	175,000	1,390,000	5,310
South Dakota, Belle Fourche	5	1,845	4,245	23	11	9	140,000	[2] 1,756,211	[2] 4,228
Washington, Okanagan	3	1,700	2,750	7	8	4	135,000	450,000	1,750
Washington, Yakima:									
Sunnyside unit	13	5,350	13,350	35	30	9	245,000	1,896,341	6,640
Tieton unit	[4] 7	24,000	27,000	10	3	.....	.....	.....	.....
Wyoming, Shoshone	4	[3] 700	[3] 2,700	6	7	3	60,000	361,000	1,875
INDIAN PROJECTS (see note).									
Montana:									
Blackfeet	4	1,900	2,070	5	8	3	.....	.....	.....
Flathead	12	4,000	18,500	55	15	9	205,000	1,283,988	4,608
Fort Peck	5	2,650	[3] 4,780	10	8	6	130,000	580,000	2,630

[1] For lands adjacent to project.
[2] 1916.
[3] Estimated.
[4] On and adjacent to project.

NOTE.—The Indian projects are classified separately because they are not constructed under the terms of the reclamation law, but in each case are authorized by specified statute in connection with the appropriations for the Indian Office.

SPEEDING UP PRODUCTION.

The response of the project people to the appeals of the President and Secretary Lane for greater crop production was instantaneous and thrilling. No more inspiring evidence of the genuine patriotism of a people was ever shown than the wave of enthusiasm which swept over our reclaimed desert valleys.

With all the energy with which they were endowed, these pioneers of the West speeded up their work, increased the acreage under plow, and put thousands of acres of new land in food crops. This was done in spite of the fact that it never cost so much in the history of the Nation to put in a crop, that hundreds of farmers' sons volunteered for service in the Army, and that labor is difficult to get. Soon thousands of acres were seeded to corn, wheat, oats, beans, peas, sugar beets, and potatoes, and every vacant lot and back yard had become a garden. Boys' and girls' clubs were formed and the women were mobilizing for producing and saving food crops. At the close of the fiscal year reports were pouring in telling of the big crops in prospect, and in the Washington office plans were being formulated for harvesting and marketing the products.

Although a few thousand carloads of potatoes, for instance, are not a large amount, it may be an abnormal crop for one of these little valleys, and as the available storage capacity on any one project is not large, it is a problem how to gather and care for a huge tonnage in the short period between harvest time and frost. The majority of the farmers have exhausted their credit in producing the food, and can not build additional storage. Under a plan proposed by Secretary Lane, the Reclamation Service, the financial and mercantile interests, and the farmers would organize on several of the projects community storage houses designed to take care of the surplus perishable crops until market and transportation facilities are favorable for distribution.

Under the plan, if carried out, the service would furnish one-third of the capital invested, the local community another third, and the produce growers the balance in cash or labor. Charges for storage would be at rates which would meet all operating expenses and provide a sinking fund for extensions and interest. These community plants, while under Government regulations, would enjoy special privileges in securing loans to all members on stocks in storage from the Federal reserve bank. Such loans would enable the farmers to meet the current obligations, and relieve them of the necessity of selling their products at a time when the markets are glutted.

RESULTS OF RECLAMATION.

The area irrigated from the Federal works reached well over a million acres in 1916. War prices stimulated development and the area in cultivation on the reclamation projects was brought nearer to the total for which water was available in spite of a substantial addition to the latter by canal extensions and other construction work. With crop yields about equal to those of former years, the great increase in prices raised the gross crop values per acre about 60 per cent.

These facts stand out in the statistics of results for 1916, when the customary crop census was taken on the Government projects. This annual census is largely gathered by the canal riders as the irrigation season draws to a close and water deliveries gradually reduce to the vanishing point. In this way the figures are secured at slight expense and yet tend to be more accurate than an ordinary census because collected by men in close touch with the irrigators and their operations throughout the season. For the same reason the census is generally restricted to the farms watered from canals operated by the Reclamation Service. A number of the projects embrace tracts to which the Government supplies water in bulk at the heads of canals or laterals not operated by the Reclamation Service. In such cases the lands are not generally covered by the census. In still other cases the United States sells water under the terms of the Warren Act to outlying areas served by private canals. In such cases the water bought from the Government may mingle with unregulated flow, and other conditions bar any accurate figures for the area thus served as a result of the Government construction. However, such data as are available show that the area irrigated from the Government works in 1916 was substantially over 1,000,000 acres.

The 1916 census covered an irrigable area of 1,405,000 acres. Of this 922,800 acres were actually watered and crops were harvested from 858,300 acres, including pastured land. The value of the crops to the farmer was nearly $33,000,000, or $38.25 per acre cropped. The corresponding figures for the previous year were $18,000,000, and $24.

The principal figures showing the areas and results by projects are given in the following table. In the discussion of the various projects in later pages are included the full crop reports for each project, and these are compiled in detail in the appendix.

Irrigation and crop results on reclamation projects, 1916.[1]

State.	Project.	Irrigable acreage.[2]	Irrigated acreage.	Cropped acreage.[3]	Value of crops.[3]	
					Total.	Average per acre cropped.
Arizona	Salt River	[4] 212,960	[4] 187,905	173,359	$8,435,719	$48.65
Arizona-California	Yuma	72,440	29,483	28,283	1,435,403	50.75
California	Orland	20,533	9,357	7,011	342,339	48.83
Colorado	Grand Valley	15,000	1,741	1,561	54,692	35.03
	Uncompahgre Valley	77,713	49,273	48,352	1,949,529	40.32
Idaho	Boise	103,370	76,922	72,581	2,327,494	32.07
	Minidoka	120,300	89,900	81,362	2,800,433	34.50
Montana	Huntley	32,271	18,634	18,581	489,071	26.32
	Milk River	40,400	5,518	4,592	70,016	15.25
	Sun River	16,321	4,717	[5] 6,425	[5] 118,990	[5] 18.52
Montana-North Dakota	Lower Yellowstone	42.288	6,020	6,020	124,586	20.70
Nebraska-Wyoming	North Platte	112,016	75,620	74,766	1,633,390	21.85
Nevada	Truckee-Carson	70,915	39,449	38,249	791,446	[6] 20.70
New Mexico	Carlsbad	24,775	16,600	14,500	416,041	28.70
	Hondo	2,918	1,324	1,219	32,200	26.42

[1] Data are for calendar year (irrigation season) except on salt River project data are for corresponding agricultural year ending Nov. 30, 1916. Figures are restricted to irrigated areas covered by crop reports, excluding about 100,000 acres irrigated but not covered by crop reports and relatively small areas on a few projects cropped without irrigation except as noted for Sun River project, Montana.

[2] Area Reclamation Service was prepared to supply water.

[3] Irrigated crops. Excludes small areas on few projects cropped by dry farming.

[4] Irrigable area includes so-called "dry lands" given right to rent water temporarily on account of full reservoir. Irrigated acreage excludes area of towns contracting for water; and 10,379 acres for which water was bought, but no crops reported, largely in pasture.

[5] Crop reports covered 158 irrigated farms which produced some crops without irrigation

[6] $30.18 excluding 10,872 acres of wild grass pasture and other fields not in full production.

Irrigation and crop results on reclamation projects, 1916—Continued.

State.	Project.	Irrigable acreage.	Irrigated acreage.	Cropped acreage.	Value of crops.	
					Total.	Average per acre cropped.
New Mexico-Texas	Rio Grande	85,000	62,513	61,818	$2,893,740	$46.81
Oregon	Umatilla	19,000	5,477	3,900	139,800	35.84
Oregon-California	Klamath	40,000	29,351	29,351	509,865	17.37
South Dakota	Belle Fourche	78,591	48,468	46,909	557,319	11.88
Utah	Strawberry Valley	38,500	30,722	25,066	1,320,135	52.70
Washington	Okanogan	10,099	7,850	5,242	328,385	62.64
	Yakima:					
	Sunnyside Unit [1]	93,226	73,000	59,449	4,341,940	73.04
	Tieton Unit	34,000	23,000	21,000	1,102,536	52.50
Wyoming	Shoshone	42,816	29,977	28,695	600,903	20.94
Totals for irrigated areas covered by crop reports.		1,405,452	922,821	858,291	32,815,972	38.25

[1] Includes irrigation districts.

War prices.—All agricultural statistics are now dominated by the effects of the world war. This is strikingly shown in the 1916 figures for the Government projects. The outstanding difference from the reports for previous years is in higher prices, and the resulting increase in crop values at the farm. Nearly all products brought much higher prices in 1916 than 1915, the increases in the yearly averages going as high as 100 per cent; the average increase was over 50 per cent. The following figures are for crops that represent three-fourths of the harvested area and total value of all crops grown on the Government projects:

Average farm prices.

Year.	Cereals.	Alfalfa hay.	Potatoes.	Sugar beets.	Cotton.
	Bushel.	*Ton.*	*Bushel.*	*Ton.*	*Pound.*
1915	$0.65	$6.59	$0.45	$5.47	$0.16
1916	.95	10.58	.93	6.14	.24
Per cent increase	45	60	100	12	50

Character of crops.—The kinds of crops grown and their relative areas show no striking change in 1916. Most of the projects are essentially hay and grain producers, incidental to diversified and live-stock farming. In 1916 hay and forage crops, including pasture, but no cereals or grain sorghum, occupied just two-thirds of the acreage and returned just one-half the total crop value. Alfalfa is the great staple, occupying 45 per cent of the area and representing 40 per cent of the crop value. It is grown on every project. On 22 of 25 it occupies more than one-third the cultivated area; on nine over one-half the total.

The statistics for 1916, as in 1915, show further gradual reduction in the proportionate area devoted to cereals and increase in that of bearing fruit. The cotton industry on the southwestern projects has shown the greatest change directly due to the war. This recent development was considered well started in 1914 with 15,000 acres in production on three projects. The outbreak of the war drove down the price and the area shrunk to 3,000 acres in 1915. The

price then began to soar. Thirteen thousand acres were planted last year, and it is predicted that 30,000 acres will be harvested in 1917.

The attached tabulation lists the principal crops grown on the Government projects, showing their relative importance in the areas cultivated and values produced.

Crop results on reclamation projects in 1916.[1]

Crop.	Acreage cropped.		Yields.			Crop value.		
	Total.	Per cent.	Unit.	Total.	Average per acre.	Average per acre.	Total.	Per cent.
Cereals:								
Barley	43,785	5.1	Bu.	1,094,908	25	$22	$987,179	3.0
Corn	35,189	4.1	Bu.	1,070,370	30	27	956,690	2.9
Oats	54,489	6.4	Bu.	1,487,519	27	15	835,049	2.5
Rye	1,196	.1	Bu.	17,035	14	16	19,423	.1
Wheat	88,896	10.4	Bu.	1,902,405	21	28	2,490,625	7.6
Total	223,555	26.1	Bu.	5,572,237	25	24	5,288,966	16.1
Other grain and seed:								
Alfalfa seed	21,288	2.5	Bu.	81,272	3.8	28	599,664	1.9
Clover seed	8,638	1.0	Bu.	32,081	3.7	34	295,650	.9
Grain sorghum	7,031	.8	Bu.	244,889	35	25	175,604	.5
Flax seed	689	.1	Bu.	4,864	7.2	16	10,722	.....
Millet seed	343	.....	Bu.	4,961	14	13	4,546	.....
Total	37,989	4.4	Bu.	368,067	.....	29	1,086,186	3.3
Hay and forage:								
Alfalfa hay	381,323	44.5	Ton.	1,225,250	3.2	34	12,957,550	39.5
Clover hay	8,373	1.0	Ton.	17,429	2.1	14	119,462	.4
Other hay	23,494	2.7	Ton.	35,016	1.5	15	348,443	1.1
Corn fodder	6,022	.7	Ton.	42,367	7	30	182,461	.5
Peas	455	.1	Bu.	9,215	20	37	17,014	.1
Other forage	32,079	3.7	.....	.....	.....	.....	1,211,078	3.7
Pasture	120,515	14.0	.....	.....	.....	[2] 13	1,549,636	4.7
Total	572,261	66.7	.....	.....	.....	29	16,385,644	50.0
Vegetables and truck:								
Beans	3,285	.4	Bu.	46,327	14	58	190,264	.6
Onions	324	.....	Bu.	95,858	296	342	110,628	.3
Potatoes, white	16,228	1.9	Bu.	2,858,512	176	163	2,648,523	8.1
Potatoes, sweet	340	.....	Bu.	27,701	82	80	27,300	.1
Truck	9,566	1.2	.....	.....	.....	96	919,911	2.8
Total	29,743	3.5	.....	.....	.....	131	3,896,626	11.9
Fruits and nuts:								
Apples	22,530	2.6	Lb.	78,660,576	3,500	67	1,509,372	4.6
Peaches	2,093	.3	Lb.	10,953,961	5,200	124	260,061	.8
Pears	2,808	.3	Lb.	17,818,663	6,350	169	474,613	1.4
Prunes	490	.1	Lb.	2,396,205	4,900	140	68,831	.2
Citrus fruit	1,499	.2	Lb.	3,126,160	2,100	98	147,423	.4
Small fruit	1,668	.2	Lb.	2,914,345	1,750	85	142,259	.4
Other fruit and nuts	196	.....	Lb.	224,300	.....	102	20,085	.1
Total [3]	[3] 32,825	[3] 3.8	Lb.	[3] 124,736,210	.....	84	[3] 2,761,852	8.4
Miscellaneous:								
Sugar beets	29,328	3.5	Ton.	306,596	10.5	64	1,881,449	5.7
Cotton	13,424	1.5	Lb.	4,975,814	338	88	1,198,048	3.6
Cotton seed	7,391	.8	Lb.	5,615,572	735	12	94,485	.3
Hops	510	.1	Lb.	900,150	1,760	183	93,416	.3
Cane	945	.1	Ton.	2,242	2.4	21	19,351	.1
Other crops	1,891	.2	.....	.....	.....	.....	109,949	.3
Total	53,489	6.2	.....	.....	.....	.....	3,396,698	10.3
Duplication	91,571	10.7	.....	.....	.....	.....	.....	.....
All crops	858,291	100.0	.....	.....	.....	38.25	32,815,972	100.0

[1] Data are for calendar year (irrigation season), except for Salt River project, Arizona, data are for corresponding agricultural year ending November 30, 1916. Figures are limited to irrigated areas covered by crop reports, excluding about 100,000 acres irrigated, but not covered by crop reports and small areas on a few projects cropped without irrigation.

[2] This figure does not represent average value of pasture for the year, as considerable areas pastured were also harvested and are included in the duplicated area.

[3] Totals include 1,541 acres, yielding 5,642,000 pounds, worth $139,208, not listed under separate items.

DRAINAGE.

A description of investigations and drainage work in progress will be found under the discussion of projects. Reference is also made to previous annual reports, especially the twelfth, thirteenth, and fourteeth, for discussions of the causes of seepage and water logging and the remedies necessary to reclaim and protect lands from damage.

During the year 1916 and 1917 investigations and surveys and also the construction of drainage works have been under way on the Yuma, Boise, Flathead, Huntley, North Platte, Truckee-Carson, Carlsbad, Rio Grande, Klamath, and Shoshone projects. At Flathead the work has been confined to the relief of seepage conditions within the town of Polson. On the Truckee-Carson and Rio Grande projects only a limited amount of construction has been accomplished, as the work has been delayed pending the formation of irrigation or drainage districts. On the Salt River, Uncompahgre, Grand Valley, and Belle Fourche projects investigations and surveys have been made leading to the planning of drainage works. Plans and estimates were completed for a drainage system for the Grand Valley Drainage District under the terms of contract with the district.

Estimates of seepage and summary of drainage work to June 30, 1917.

Projects.	Drains.		Estimated area damaged by seepage.	Estimated area protected by constructed drains.	Estimated area to be protected when all drains authorized are constructed.
	Open.	Closed.			
	Miles.	*Miles.*	*Acres.*	*Acres.*	*Acres.*
Arizona: Salt River			6,400		
Arizona-California: Yuma	14.5	4.0	8,000	12,000	52,000
Colorado:					
Grand Valley	.7		250	50	
Uncompahgre			16,300		
Idaho:					
Boise—					
Pioneer irrigation district	78.5	.8	10,500	30,000	30,000
Nampa-Meridian district	43.7		6,200	50,000	50,000
Other parts of project	9.7		2,050	3,500	3,500
Minidoka	109.0		543	30,000	30,000
Montana:					
Flathead (Indian)	.18	2.97	360	1,240	1,240
Huntley	15.77	43.29	1,704	20,000	24,000
Sun River			2,250		
Montana-North Dakota: Lower Yellowstone	4.5	1.1	1,300	1,600	1,600
Nebraska-Wyoming: North Platte	20.4	14.0	3,000	5,000	6,000
Nevada: Truckee-Carson	9.5	3.99	11,000	11,000	16,000
New Mexico: Carlsbad	9.0	3.9	3,061	2,769	5,000
New Mexico-Texas: Rio Grande	11.5		55,000	5,100	(1)
Oregon:					
Klamath	67.7	5.7	6,200	17,000	29,600
Umatilla	10.0		200	2,000	2,000
South Dakota: Belle Fourche			3,250		
Wyoming: Shoshone	11.57	67.90	5,000	14,000	17,500

[1] Preliminary plans have been developed for the construction of drains to protect 100,000 acres of land in Texas and New Mexico, but work at present is suspended, pending drawing up of a suitable contract with the newly formed irrigation district in Texas; such district has not yet been formed in New Mexico.

A summary of work done and an estimate of seepage are shown in the accompanying table. The data relative to areas protected or to be protected by drains when completed are dependent on many varying factors. It is impossible in advance of complete irrigation

over a given area to foretell with certainty what portion may become seeped and water-logged. The amount of water used and the manner in which it is applied to the soil are important factors in influencing the spread of seepage. These are dependent upon the care and skill of the irrigator. The natural drainage of different soils can be roughly approximated only, yet it is of great importance in preventing the rise of ground water. On account of these and other equally indeterminable factors, the results given should be regarded as expressions of opinion rather than accurate engineering determinations.

Where drainage works have been built and the ground water lowered there has been a gradual decrease in the areas unfit for irrigation due to seepage and alkali. It is believed, however, that results obtained in reclaiming land already injured are of far less importance than the protection afforded to threatened areas where the water table had not yet risen to sufficient height to render the lands unfit for cultivation. In order to protect, as far as possible, large areas from becoming seeped and water-logged, a careful watch has been kept of the elevation of ground water on the various projects and whenever its rise has been sufficient to threaten the irrigability of the land, investigation and studies leading to plans for drainage works have been undertaken. On many projects it has been necessary, before commencing work, to obtain the consent of water users to the payment of cost, either by supplemental construction contracts or through district organizations. Failure to take advantage of the means offered for providing funds has, in some cases, delayed or prevented the taking up of construction of drainage works as soon as their need became apparent.

Studies that have been made show in several instances a marked rise in water table over all, or a large portion, of a project during periods of heavy irrigation. In some cases this rise can be accounted for partly by canal losses; generally, however, it is apparently due to direct irrigation of the land. The amount of water discharged by drainage systems serving large areas has, in some cases, been as great as 40 per cent of the total applied in irrigation. For small areas so situated that they offer an opportunity for ground water to accumulate upon them, the discharge of drains has, in several cases, been greater than the amount of water applied to the lands they were intended to serve. These observations indicate that a large amount of water is being wasted underground through the application, at a single irrigation, of more than the soils can retain. This waste can be prevented only by better preparation of the land and more careful application of water.

The efficiency of drains depends upon their being maintained at all times in such condition as to hold the water table down to a minimum. Obstructions such as weeds and other débris which accumulate in open drains, and the occasional clogging of pipe in closed drains tend to raise the grades and to lessen the effect in lowering the water table. The importance and amount of care involved in keeping drains in working order has, in some instances, been sufficient to require a special force for patrol and maintenance during the irrigation season. The greatest economy as well as efficiency is reached by maintaining drains constantly in working order.

POWER DEVELOPMENT.

During the fiscal year 1917, several improvements and extensions to existing power systems were undertaken. The Grandview pumping system on the Sunnyside unit of the Yakima project was completed to such an extent that partial delivery of water was started, and the development of power for the construction of the Tieton Dam was begun. Plans were prepared for a large drainage pumping plant in the lower Yuma Valley. Studies and estimates were made for numerous possible extensions and new developments on various projects. The income from the sale of surplus power on various projects was materially increased during the fiscal year.

The following tables show the power and pumping plants installed on the various projects and the results of operation for the fiscal year ending June 30, 1917:

Power plants operated by United States Reclamation Service, fiscal year 1916–17.

Project.	Name of plant.	Type.	Capacity.	Number of units.	Head.	First cost of plant.	Output.	Cost per kilowatt-hour, without depreciation.	Cost per kilowatt-hour, depreciation only.	Distribution of power generated (kilowatt-hours).						Gross income from power sales.
										Sold to customers.	Used for irrigation pumping.	Used for construction.	Used for camp lights, etc.	Used for drainage work.	Losses.	
			Kilowatts.		*Feet.*		*Kilowatt-hours.*	*Cents.*	*Cents.*							
Salt River	Roosevelt [1]	Hydro-electric.	10,000	6	80–226	$557,559.86	48,112,800	0.105	0.061							
Do	Cross Cut	do	5,000	6	111	480,454.60	9,612,000	.172	.084							
Do	South Consolidated.	do	2,000	2	31	163,139.60	6,148,400	.186	.169	60,964,565	2,648,040	83,110	132,064		2,791,681	$495,049.56
Boise	Boise [2]	do	1,875	3	30	167,905.37	4,228,720			(2)		996,437	60,136			
Minidoka	Minidoka	do	7,000	5	46.4	484,904.82	40,762,730	.036		17,009,555	19,090,760		818,794	203,940	3,639,681	41,529.57
Do	Arizona Falls	do	1,000	2	19	109,500.73	2,745,660	.278	.138							
Truckee-Carson	Lahontan [3]	do	1,875	3	112	136,828.00	4,758,320			1,023			11,804			16,331.86
Rio Grande	Power plant	do	150	1	170	8,440.00	59,100	3.16		1,200		50,000	7,900			52.21
Strawberry Valley.	Spanish Fork.	do	850	2	123	68,812.15	1,043,661	1	.23	939,365		10,000	67,999		26,297	9,756.10
Okanogan	Power plant No. 1.	do	187	1	187	11,100.00	6,870	.73	4.7	6,870						140.00
Do	Power plant No. 2.	do	187	1	187	12,925.00	11,310	1.77	3.3	11,310						440.00
Yakima-Sunnyside.	Rocky Ford [4]	do	187	1												
North Dakota pumping.	Williston	Steam-electric.	1,150	5		288,699.39	1,222,310	2.25	.242	943,050			229,701		49,559	30,561.00

[1] Units 1, 2, and 3 not in service during year.
[2] Leased to Electrical Investment Co. for 5 years beginning May 16, 1916.
[3] Leased to Canyon Power Co. for 10 years beginning Dec. 1, 1914.
[4] 90 per cent completed.

Pumping plants operated by the United States Reclamation Service during fiscal year 1916–17.

Project.	Name of plant.	Type.[1]	Capacity of prime movers.	Number of units.	Head pumped against.	First cost of plant.	Energy used for pumping.	Acre-feet pumped.	Cost per acre-foot.
			Horsepower.		*Feet.*		*Kilowatt-hours.*		
Salt River..	Battery A...	V. M. D. C..	75	1	49.0	$16,425.49	67,800	409	$0.532
Do.....	Battery B...	.....do.....	75	1	46.2	20,603.87	118,272	1,480	.412
Do.....	Battery C...	.....do.....	75	1	48.4	16,734.94	102,925	1,400	.451
Do.....	Battery D...	.....do.....	75	1	46.5	19,358.12	75,540	1,040	.626
Do.....	Battery E...	.....do.....	75	1	44.5	21,848.29	100,640	1,323	.426
Do.....	Battery F...	.....do.....	75	1	32.0	16,808.09	88,140	1,209	.419
Do.....	Clemans.....	H. M. D. C..	100	1	31.3	8,124.41	273,302	3,425	.361
Do.....	San Francisco.	.....do.....	100	1	30.0	29,978.98	13,411	173	.414
Do.....	McQueen well.	V. M. D. C..	75	1	40.0	17,254.44	38,097	583	.42
Do.....	Highline....	H. M. D. C..	150	3	43.0	27,228.70	1,771,352	14,072	.576
Yuma.....	Reservation drainage.	G. E. D. C...	110	2	5–6	6,775.60	.....	3,231	.40
Do.....	Valley pumping plant.	.....do.....	40	1	4.0	900.00	.....	372	2.00
Minidoka...	First lift.....	V. M. D. C..	2,760	5	28.77	180,314.33	7,032,616	166,399	
Do.....	Second lift..	.....do.....	2,400	4	30.0	187,090.51	11,824,525	136,494	.178
Do.....	Third lift....	.....do.....	1,560	3	30.24	99,951.49		80,865	
Do.....	West End [2]	H. M. D. C..	150	2	20.83	18,371.56	220,466	5,211	.111
Do.....	1812 station.[2]	Scoop wheel.	10	1	5.32	3,636.04	.....	336	.355
Do.....	A–4 raise [2]...	.....do.....	25	1	2.91	3,202.34	5,660	1,428	.054
Do.....	1817 raise....	H. M. D. C..	5	1	3.48	1,008.76	2,641	73	.076
Do.....	114 station [2].	.....do.....	7.5	1	7.0	2,891.61	4,750	68	1.412
Do.....	Boersch Lake.[2]	V. M. D. C..	100	2	22.0	.....	203,640	.....	.....
Huntley....	Ballantine pumping station.	V. T. D. C...	596	2	46.32	71,522.30	.....	6,058	.20
North Dakota Pumping.	Substation A.[3]	H. M. D. C..	600	4	56.0	36,019.71	.....	.....	.....
Do.....	Substation E.[3]	S. T. D. C...	450	2	50.7	[4]	.....	.....	.....
Do.....	Substation 2.[3]	H. M. D. C..	175	2	27.4	13,914.03	.....	.....	.....
Do.....	Substation 4.[3]	.....do.....	100	1	27.4	8,187.44	.....	.....	.....
Do.....	Barge	.....do.....	540	4	30.0	36,474.04	.....	.....	.....
Do.....	Substation D.[3]	S. T. D. C...	40	1	21.6	[4]	.....	.....	.....
Okanogan..	Robinson Flat.	H. M. D. C..	200	2	188.0	28,075.00	.....	.....	.....
Yakima....	Snipes Mountain.	V. T. D. C...	500	2	197.0	42,030.00	.....	.....	.....
Do.....	Hillcrest....	.....do.....	35	1	103.0	5,660.00	.....	.....	.....
Do.....	Outlook.....	.....do.....	800	2	109.0	82,850.00	.....	.....	.....
Do.....	Grandview.[5]	H. M. D. C..	214	1	78.0	.....	.....	.....	.....
			175	2	35.0	.....	.....	.....	.....

[1] Type V. M. D. C.=vertical motor-driven centrifugal pump. Type H. M. D. C=horizontal motor driven centrifugal pump. Type S. T. D. C.=steam turbine-driven centrifugal pump. Type V. T. D. C=vertical hydraulic-turbine-driven centrifugal pump. Type G. E. D. C.=gas-engine-driven centrifugal pump.

[2] Data from July 1, 1916, to Dec. 31, 1916. Plant operated by Minidoka Irrigation District since Jan. 1, 1917.

[3] Not operated during year.

[4] Part of steam plant.

[5] 80 per cent completed.

Contracts for sale of power in force June 30, 1917.

Project.	Name of contractor.	Date of contract.	Date of expiration.	Limit of load.	Rate per kilowatt-hour.	Gross income fiscal year 1916-17.	Remarks.
				Kilowatts.	*Cents.*		
Salt River	Inspiration Consolidated Copper Co	July 15, 1912	Aug. 2, 1912	8,000	0.75	$382,884.00	
Do	Pacific Gas & Electric Co.[1]	Aug. 10, 1916	Sept. 30, 1916	2,500	1.5 to .8	82,311.49	
Do	Consolidated Canal Co	Dec. 13, 1912	Perpetual	600	1	15,993.00	
Do	Town of Glendale	Feb. 6, 1914	Mar. 16, 1916	25	5 to 1.67	4,081.14	
Do	S. D. Lount & Son	May 22, 1917	May 21, 1918	100	4 to 1.33	3,857.25	
Do	Salt River Valley Water Users Association (delivery of power to Sacaton Indian School).	May 11, 1907	Perpetual	750	At cost	1,298.42	
Do	Roosevelt Mercantile Co	Mar. 1, 1911	Mar. 1, 1916	None.	5	391.60	Lights, $30 per month. Power, 5 cents.
Do	Ingleside Club	Dec. 1, 1916	Nov. 30, 1917	3	7½ to 2.51	184.90	
Do	Mons Ellington	May 12, 1916	May 11, 1917	5	10 to 3.33	25.60	
Do	C. C. Griffin	Dec. 1, 1916	Nov. 30, 1917	1	10 to 3.33	16.18	
Do	W. J. Clemans	do	do	1	10 to 3.33	11.18	
Boise	Electric Investment Co.[2]	May 1, 1916	Apr. 30, 1921	1,875	.35	11,000.00	
Minidoka	City of Burley[3]	Apr. 21, 1910	Apr. 21, 1920	3,000	2.7 to 5	14,343.11	
Do	Rupert Electric Co.[3]	Mar. 16, 1910	Mar. 16, 1920	1,700	2.7 to 5	12,327.10	
Do	Village of Albion	Oct. 15, 1915	Jan. 28, 1926	100	Standard[4]	3,246.78	Guarantee of $47,000 during contract.

[1] Consumer's rates: House lighting, 6 to 9 cents per kilowatt-hour; business lighting, 3 to 9 cents per kilowatt hour; power, 1.5 to 6 cents per kilowatt-hour.

[2] Lease of Boise power plant.

[3] Consumer's rates: Lighting, 5½ to 7 cents per kilowatt-hour; heating, $1 to $2.50 per month for 1,000 watts capacity; power, 0.55 to 6 cents per kilowatt-hour plus 50 to 75 cents per month per connected horsepower.

[4] *Minidoka standard rates for electric light and power.*

For 50 hours' use of maximum demand	$2.00 per month per kilowatt.
Next 50 hours' use of maximum demand	.03 per kilowatt-hour.
Next 50 hours' use of maximum demand	.02 per kilowatt-hour.
Next 150 hours' use of maximum demand	.01 per kilowatt-hour.
Balance hours' use of maximum demand	.005 per kilowatt-hour.

Above rates increase 25 per cent during June, July, and August.

Above rates subject to following discounts:

For maximum demand of—	Per cent.
2 kilowatts and less than 4 kilowatts	2
4 kilowatts and less than 7 kilowatts	4
7 kilowatts and less than 11 kilowatts	6
11 kilowatts and less than 15 kilowatts	8

(Continued on page 27.)

Contracts for sale of power in force June 30, 1917—Continued.

Project.	Name of contractor.	Date of contract.	Date of expiration.	Limit of load.	Rate per kilowatt-hour.	Gross income fiscal year 1916-17.	Remarks.
				Kilowatts.	*Cents.*		
Minidoka	Village of Albion [1]	Sept. 18, 1916	Jan. 8, 1926	200		$1,370.00	Heating contract, Oct. 1 to Apr. 30.
Do	Amalgamated Sugar Co	Oct. 16, 1912	Dec. 21, 1922	170	Standard	2,458.70	
Do	Ernest B. Skinner [2]	Mar. 9, 1910	Mar. 9, 1920	1,500	2.7 to 5	1,789.70	$1,500 minimum.
Do	Paul Electric Co	Jan. 20, 1914	Feb. 13, 1924	150	Standard	1,117.52	
Do	Portland Feeder Co	Sept. 13, 1913	Feb. 11, 1917	42	do	633.76	
Do	do	Feb. 12, 1917	July 1, 1918	42	do	448.88	
Do	Burley Milling & Elevator Co	Oct. 2, 1915	Nov. 5, 1920	10	do	408.09	$33.33 minimum.
Do	Schodde Electric Co	May 24, 1915	June 28, 1925	7	do	160.95	
Do	Minidoka North Side Power Co	Apr. 1, 1913	Sept. 2, 1923	2	do	157.01	
Do	Minidoka Irrigation District	Dec. 2, 1916			0.3	662.87	
Do	do	Jan. 27, 1917	Apr. 4, 1927	1	Standard	134.50	
Do	Geo. S. Matthews	Jan. 24, 1917	Feb. 1, 1927	2	do	100.51	
Do	Acequia Dairy & Produce Co	Mar. 1, 1916	May 19, 1926	.5	do	75.96	
Do	Farmers Electric Co	June 1, 1914	June 29, 1924	2	do	73.70	
Do	Thomas B. Anderson	Oct. 21, 1914	Jan. 2, 1925	2	do	51.69	
Do	E. C. Holley	May 25, 1915	Sept. 3, 1925	.5	do	47.26	
Do	Noah C. Lowry	Nov. 23, 1913	Dec. 11, 1923	.5	do	42.93	
Do	James H. Lewis	Oct. 21, 1914	Feb. 9, 1920	1	do	37.58	
Do	Rural Electric Co	Mar. 19, 1917	July 1, 1927	5	do	28.19	
Do	Matias Christien	Oct. 21, 1914	Jan. 2, 1925	1	do	25.76	
Do	W. A. Drew	do	do	1	do	23.60	
Do	J. R. Cattell	Sept. 25, 1914	Oct. 12, 1924	1	do	23.46	
Do	A. F. Ames	Oct. 21, 1914	Jan. 2, 1925	1	do	22.94	
Do	Harvey Moncur	Sept. 16, 1914	Oct. 9, 1924	1	do	22.71	
Do	E. T. Hollenbeck	Oct. 21, 1914	Jan. 2, 1925	1	do	20.75	
Do	Ira G. Clayville	do	do	1	do	20.21	
Do	John D. Hunsinger	do	do	1	do	20.01	
Do	W. T. McCord	do	Jan. 2, 1918	1	do	20.01	
Do	William Williamson			3	do	19.25	Contract for 1 month only.
Do	Lee St. Clair	Sept. 15, 1915	Oct. 1, 1925	.5	do	18.47	
Do	Ralph E. Scoville	Jan. 19, 1913	Apr. 8, 1918	.5	do	13.73	
Do	Ernest J. Hansen	Oct. 1, 1914	Jan. 13, 1925	.5	do	13.11	
Do	William E. Helm	May 25, 1915	Sept. 3, 1925	.5	do	11.73	
Do	W. M. Jordan	Dec. 8, 1915	Apr. 3, 1926	.5	do	11.62	
Do	L. G. Taylor	May 25, 1915	Sept. 3, 1925	.5	do	10.65	
Do	Frank W. True	Oct. 12, 1915	Jan. 3, 1926	.5	do	10.61	
Do	James M. Still	July 26, 1915	Aug. 10, 1925	.5	do	10.56	
Do	W. A. Gill	Oct. 18, 1915	Jan. 11, 1926	.5	do	10.56	
Do	C. M. Daley	Apr. 21, 1917	May 1, 1927	1	do	1.15	

Truckee-Carson	Canyon Power Co. [3]	July 10, 1914	Nov. 30, 1924	1,500	.25– .375	16,251.80	
Do	W. A. Harmon	May 29, 1914			5	37.00	Minimum, $3 per month.
Do	Thos. Dolf	do			5	43.05	Do.
North Dakota Pumping.	City of Williston [4]	Oct. 16, 1912	Oct. 16, 1922	600	4½ to 2	30,561.00	
Strawberry Valley	Payson City [5]			100	1	4,790.95	Minimum charge, $150 per month.
Okanogan	Okanogan Valley Power Co	May 10, 1917	May 10, 1920			580.00	Rate, $10 per day. 90 days minimum.
Do	Spanish Fork City [6]	July 12, 1915	July 17, 1918	400	1	4,166.30	Minimum charge, $225 per month.
Do	Town of Salem [7]	Jan. 19, 1915	Mar. 25, 1918	50	1½	729.45	Minimum charge, $60 per month.
Do	Joseph Lucas	Mar. 20, 1917	Mar. 20, 1918	5	9	36.60	Minimum charge, $3 per month.

(Footnote 4 continuedf rom page 25.)

Above rates subject to following discount—Continued.

For maximum demand of—Continued.

	Per cent.
15 kilowatts and less than 19 kilowatts	10
19 kilowatts and less than 24 kilowatts	12
24 kilowatts and less than 29 kilowatts	14
29 kilowatts and less than 35 kilowatts	16
35 kilowatts and less than 41 kilowatts	18
41 kilowatts and less than 48 kilowatts	20
48 kilowatts and less than 57 kilowatts	22
57 kilowatts and less than 67 kilowatts	24
67 kilowatts and less than 80 kilowatts	26
80 kilowatts and less than 100 kilowatts	28
100 and over	30

Minimum payment shall not be less than $1.80 per month per kilowatt of the contractor's agreed maximum demand. All above rates subject to 10 per cent discount if energy is delivered and metered at approximately 2,200 or more volts, or 8 per cent if delivered at approximately 2,200 or more volts and metered at a lower voltage.

[1] Consumer's rates: Heating, $1.25 per month per 1,000 watts.

[2] Consumer's rates: Lighting, 5 to 25 cents per light per month; heating, $1 to $2.50 per month per 1,000 watts capacity; power, 0.55 to 6 cents per kilowatt-hour plus 50 to 75 cents per month per connected horsepower.

[3] Lease of Lohontan power plant. Consumer's rates: Lighting, 5¾ to 15 cents per kilowatt-hour: power, 2 to 6½ cents per kilowatt-hour.

[4] Consumer's rates: Lighting, 10 cents per kilowatt-hour; cooking, 4 cents per kilowatt-hour.

[5] Consumer's rates: Lighting, 8 cents for first 10 kilowatt-hours; 6 cents for all over that amount; power 2 to 3 cents per kilowatt-hour.

[6] Consumer's rates: Lighting, 10 cents per kilowatt-hour, less 10 per cent for cash; power and heating, 3 cents per kilowatt-hour.

[7] Consumer's rates: Lighting, 10 cents per kilowatt-hour.

UNDEVELOPED POWER.

In the following table are listed the power sites which have been investigated more or less completely by the Reclamation Service, but which have not been developed. The data given are necessarily in many cases only roughly approximate, but the table serves to indicate the great power possibilities of the projects.

Undeveloped water power.

Project.	Name of plant.	Head.	Horsepower.
Arizona-California:		*Feet.*	
Yuma	Drop in California Canal	10	1,200
Do	Araz	22	9,000
Do	Laguna Dam (doubtful)	9–18	4,000
California:			
Iron Canyon	Iron Canyon	60–130	35,000
Orland	Drop, high line to South Canal	27	678
Pit River	Hat Creek	200	9,000–12,000
Do	Fall River	70–400	7,000–40,000
Do	Big Bend	800–900	150,000
Colorado:			
Grand Valley [1]	Main Canal	31–48	3,000
Uncompahgre [1]	Various sites	18–160	40,000
Idaho:			
Boise	Arrowrock Dam	60–230	10,000–20,000
Do [1]	Various sites	20–90	1,900
Minidoka	Minidoka Dam	46	10,000
Do	Head of Walcott Lake	46	30,000
Montana:			
Flathead (Indian)	No. 1 Newell Tunnel	169	130,000
Do	No. 2 Buffalo Dam	48	38,000
Do	No. 3	24	19,000
Do	No. 4	88	70,000
Do	No. 5	19	15,000
Huntley	Second drop, main canal	41	275
Montana-North Dakota:			
Lower Yellowstone [1]	Lateral K. K. drop	34	314
Nebraska:			
North Platte [1]	Pathfinder Dam	60–200	17,000–60,000
Nevada:			
Truckee-Carson	Lahontan	120	5,000
Do	26-foot drop	26	2,900
New Mexico-Texas: Elephant Butte.	Elephant Butte Dam	65–185	12,000
Oregon:			
Columbia River	Celilo Falls	45–105	500,000–800,000
Deschutes	4 sites	65–110	90,000–100,000
Silver Lake	Silver Creek	48–120	2,900
Umatilla	Drainage outfall	28	145
Warner Valley	Deep Creek		2,000
Willamette Valley	Santiam River and Marion Lake		14,000
Do	McKenzie River, 2 plants	415–550	30,500
Do	Middle Fork Willamette and Waldo Lake Storage.	[2] 4,400	65,000
Oregon-California: Klamath	Various sites	21–88	10,000
Utah: Strawberry Valley	Spanish Fork	126	1,500
Washington:			
Columbia River	Priest Rapids	60	200,000
Okanogan	Salmon Creek No. 1	347	2,000
Do	Salmon Creek No. 3	441	2,550
Yakima-Sunnyside	Mabton	44	131
Do	Main Canal	54	276
Yakima-Tieton	Lateral E	100	3,410
Yakima-Wapato	Drop 0	24	2,930
Do	Drop 1	40	4,083
Do	Drop 2	32	2,443
Do	Drop 3	34	1,488
Wyoming: Shoshone	Shoshone	200	40,000
Total			1,506,300–1,954,300

[1] Power from irrigation flow only.

[2] Several stages.

ELECTRICAL AND MECHANICAL ENGINEERING.

The electrical and mechanical engineering work of the service is handled by the electrical division of the Denver office. In addition to routine duties the following work was accomplished during the fiscal year ending June 30, 1917:

Arizona, Salt River project.—Designs were prepared and material purchased for the reconstruction of the north outlet of the Roosevelt Dam. Material was purchased for adapting the constant head turbines at the Roosevelt power plant for operation on variable head to be obtained from the reservoir by tapping the sluicing tunnel. Preliminary designs and specifications were prepared for the development of the Chandler power site and the construction of the Goldfield-Superior transmission line under the power contract with the Magma Copper Co. A motor-generator exciter set was purchased for the Roosevelt power plant.

Arizona-California, Yuma project.—Preliminary plans were prepared and machinery purchased for pumping the drainage water from the lower Yuma Valley into the Colorado River. The first installation will include two oil engines direct connected to screw pumps for a combined capacity of 75 second-feet at a maximum lift of 15 feet. Preliminary study was given to the proposed Yuma Mesa pumping project.

Idaho, Boise project.—Preliminary estimates were prepared for the construction of a 10,000-horsepower hydroelectric plant at Arrowrock Dam and for several small pumping plants at various points on the Boise project.

Idaho, Minidoka project.—Designs were prepared and material purchased for the construction of a substation to deliver power to the town of Paul.

Kansas, Garden City project.—A complete inventory and appraisal was made of the equipment of the Garden City project.

Montana, Huntley project.—Estimates were prepared for an auxiliary pumping plant to increase the water supply for the High Line Canal.

Nebraska-Wyoming, North Platte project.—The question of telephone service for the Fort Laramie unit of the North Platte project was studied and material necessary for the construction of 50 miles of line was purchased.

Utah, Strawberry Valley project.—A standard schedule of rates for the sale of electric power was worked out. Assistance was given in the negotiations for the sale of additional power from the Spanish Fork power plant. An appraisal was made and specifications prepared for the lease of the power plant and transmission lines.

Washington, Okanogan project.—The available output of one of the power plants on the Okanogan project was leased to the Okanogan Valley Power Co. for a period of three years. The plants were placed in operation June 1, 1917.

Washington, Yakima project, storage unit.—A report was prepared on the power supply for the construction of the Tieton Dam. Designs were made and necessary equipment purchased or transferred for a 700-horsepower plant for the above purpose.

Washington, Yakima project, Sunnyside unit.—Equipment for the Grandview pumping plant was purchased and the design of the instal-

lation completed. The Snipes Mountain pumping units were retested, with very satisfactory results. Estimates of the Prosser and Granger pumping plants were prepared.

Montana, Flathead (Indian) project.—Butterfly and cylinder gates for the outlets of the McDonald and Tabor Reservoirs were designed, purchased, and inspected.

CEMENT-TESTING WORK.

The amount of cement for which tests were made during the fiscal year ending June 30, 1917, was 114,463 barrels, of which 111,163 barrels were accepted and 3,300 barrels rejected. The following table shows the number of barrels for which tests have been made and the amount and per cent accepted from 1904, when the testing laboratory was opened, to June 30, 1917:

Year.	Amount for which tests were made.	Accepted.	
		Amount.	Per cent.
	Barrels.	*Barrels.*	
Jan. 1, 1904, to June 30, 1906	160,044	146,602	91.6
Year ending June 30, 1907	197,321	191,204	96.9
Year ending June 30, 1908	147,554	137,526	93.2
Year ending June 30, 1909	196,097	163,733	83.5
Year ending June 30, 1910	140,293	127,743	91.1
Year ending June 30, 1911	93,986	88,986	94.6
Year ending June 30, 1912	160,553	149,303	92.9
Year ending June 30, 1913	181,653	170,473	93.8
Year ending June 30, 1914	404,885	391,135	96.6
Year ending June 30, 1915	602,288	583,588	96.9
Year ending June 30, 1916	171,213	168,213	98.2
Year ending June 30, 1917	114,463	111,163	97.7
Total	2,570,350	2,429,669	94.5

All cement purchased during the fiscal year ending June 30, 1917, has been purchased under the United States Government specifications for Portland cement issued under date of May 1, 1912, and the methods of testing employed in the laboratory have been in accordance with those provided for in these specifications. In the appendix will be found a table giving the average results of all tests on accepted cement from Jannary 1, 1904, to June 30, 1917.

Regular sets of long-time tests have been continued, and have included both tensile and compressive tests. Also occasional chemical analyses have been made as a matter of record on all brands under test. Other general work has included tests on samples of concrete aggregates and water and soil analyses for various projects, inspection of draintile shipments, and miscellaneous tests and analyses as required.

PURCHASE AND TRANSPORTATION OF MATERIALS.

Most of the important purchases for the service are made by the Denver office, where a purchasing department is maintained. The project offices purchase direct perishable foods, forage, and such other commodities as can be purchased locally to best advantage. By purchasing through the Denver office all projects get the benefits inherent in large-scale purchases, and in the purchase of materials of construc-

tion the purchasing department of that office has the advantage of advice of the several engineers and technical departments.

Purchasing during the past year has been handicapped by very adverse market and transportation conditions. Deliveries have been slow, jobbers' stocks depleted, and factory deliveries without definite date. This has caused much extra work in tracing and canceling orders and placing them elsewhere, and in many cases the service has been required to take what the market afforded rather than exactly what was wanted. Railroad congestion has made it very difficult to obtain the necessary transportation equipment.

The total number of purchases by the Denver office for the field during the past year was 4,989, with a total value of $1,095,830.36. The cash discounts earned by prompt payments of bills amounted to $13,000.25. A total of 5,931 Government bills of lading were issued, covering the movement of freight. The following table gives available data covering purchases made by the central purchasing office:

Fiscal year.	Number purchases.	Gross amount.	Discount.
1910	1,774	$504,023.60	.....
1911	1,607	574,323.74	.....
1912	2,205	930,018.53	.....
1913	2,735	459,890.17	$4,286.29
1914	3,116	471,446.28	4,601.28
1915	2,854	454,661.46	3,842.09
1916	5,049	680,601.99	6,747.38
1917	4,989	1,095,830.36	13,000.25
Total	24,329	5,170,796.13	32,480.29

On July 1, 1916, the unsettled bills for freight and express transportation charges amounted to $129,796.34. There were received during the fiscal year for administrative examination new bills filed for $340,720.27.

Bills filed for $410,773.01 were examined, the amount due found to be $393,477.70, and settlement arranged with claimants on that basis, leaving outstanding on June 30, 1917, bills amounting to $59,743.60.

The commercial charges on freight and express bills settled during the year would have amounted to $653,013.98.

Passenger transportation bills to amount of $47,563.15 were also given administrative examination and transmitted to the Treasury Department for payment.

During the fiscal year there were filed with the various transportation companies, in accordance with freight contracts, refund claims on contractors' shipments amounting to $25,370.64, which, as paid, are covered into the reclamation fund.

The following table gives general data regarding freight and express charges since 1906:

Year.	Bills settled.	Commercial charges.	Deducted account of contracts, land grant and other causes.	
			Total.	Per cent.
1906–7	$278,782.10	$470,863.26	$192,081.16	40.8
1907–8	369,583.04	577,830.42	208,247.38	36.0
1908–9	778,047.12	1,403,970.10	625,922.98	44.5
1909–10	437,032.61	758,808.76	321,776.15	42.4
1910–11	405,360.55	666,876.59	261,516.04	39.2
1911–12	610,740.23	1,055,733.27	444,993.04	42.1
1912–13	481,118.91	837,077.59	355,958.68	42.5
1913–14	547,705.99	927,163.49	379,457.50	40.9
1914–15	778,893.33	1,393,347.96	614,454.63	44.1
1915–16	471,606.52	817,481.33	345,874.81	42.3
1916–17	393,477.70	653,013.98	259,536.28	39.7
Total	5,552,348.10	9,562,166.75	4,009,818.65	41.9

LEGAL DIVISION.

The legal work of the Reclamation Service is in charge of a chief counsel. This work is carried on by (*a*) district counsel, who are assigned to districts comprising one or more projects and who act as the legal advisors of the project managers in their respective districts; (*b*) the Denver office of the chief counsel, which acts in a like capacity to the chief of construction, and (*c*) the Washington office of the chief counsel, which supervises the work of the several district counsel in the field and of the Denver office of the chief counsel, and is under the immediate supervision of the chief counsel himself.

The work in the Washington office is carried on by two sections, a law section and a land and general section. The law section considers the more strictly legal questions, and is engaged in the preparation of memorandum opinions for the advice of the Reclamation Commission, the preparation of public notices, examination of abstracts of title, and looking after legislation and kindred matters; the land and general section concerns itself with routine examination of contracts, with the withdrawals and restorations of lands in connection with the activities of the service, and preparation of farm-unit plats and their amendments; and both sections handle more or less of administrative matters. The more important field work is all checked in the Washington office.

With the present investment of many millions of dollars in irrigation work, the building of new works, and the operation of those already constructed for supplying water to approximately 25,000 water users, and the coming in contact at all times with private interests in the domain of law, the rules of which are still in a formative period, legal questions are constantly presented for decision, many of which are complex and difficult of solution. The more important and larger of these are passed upon personally by the chief counsel.

In addition to these larger legal questions there are numerous lesser ones, questions of a semilegal nature and administrative matters constantly referred to the Washington office from the field force of the chief counsel's office, for consideration and advice, and largely passed upon by the law and land and general sections under the immediate supervision of the chief counsel. The class of work handled varies from the simpler forms of contracts for the purchase of supplies to the complex form of contracts with irrigation districts in the several States.

Considerable time has been spent during the year in a revision of the Reclamation Manual, which is the book of general regulations of the service. Some idea of the great variety of subjects regarding which the service is called upon to act and which the chief counsel's office is required to pass upon appears from the fact that the manual is a book of over 500 pages. Constant changes are being made in these regulations by decisions of the department, comptroller's decisions, and the decisions of the various State and Federal courts, all of which are checked by the Washington office of the chief counsel.

An important new work undertaken by the legal division during the past year was the drafting of bills proposing to amend irrigation district laws in the several States wherein the Reclamation Service operates. The advantage to be secured to both the people and the Government through this legislation is in having the project affairs, which are conducted by the water users, handled by a public corporation instead of a private corporation, as the old water users' associations can not properly perform all of the functions required of water users' organizations.

It was found that a change in the irrigation district laws of all of the reclamation States would be necessary to permit proper contracts between the Government and irrigation districts, and bills to amend existing laws in the several States were then prepared. Upon request of legislative committees of those States representatives of the legal division attended meetings of such committees and gave such assistance as was proper and practicable. New or amendatory legislation was enacted in the following States: Arizona, California, Colorado, Idaho, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, and Washington.

As a necessary correlation with the study by the engineering division of the water supply in the Colorado River Basin, the legal division has been conducting an investigation of the water-right situation in the basin, including a digest of laws and decisions, a study of international and interstate questions, tabulations of all water-right filings, permits and decrees, a compilation of acreage irrigated, and other data essential to the subject. A like study of the North Platte River Basin is now contemplated.

The field offices of the legal division are located as follows:

Title.	Location.
Assistant chief counsel	Denver, Colo.
District counsel, irrigation district organization	Do.
District counsel in charge, advisory to the chief of construction's office.	Do.
Water-right investigation	Do.
District counsel in charge of titles	Los Angeles, Cal.
District counsel	El Paso, Tex.
District counsel	Los Angeles, Cal.
District counsel	Portland, Oreg.
District counsel	North Yakima, Wash.
District counsel	Boise, Idaho.
District counsel	Helena, Mont.
District counsel	Scottsbluff, Nebr.
District counsel	Montrose, Colo.

LITIGATION.

The following table shows the general progress of litigation during the fiscal year:

Number of cases pending at beginning of year	48
Number of cases initiated during the year	18
Total	66
Number of cases disposed of during the year	17
Number of cases pending at the end of the year	49

CONTRACTS UNDER WARREN ACT.

[Feb. 21, 1911, 36 Stat., 925.]

BOISE PROJECT, IDAHO.

Name of contractor.	Date of contract.	Amount of water in acre-feet.
Farmers' Union Ditch Co.	Aug. 27, 1916	335
New York Canal Co.	Aug. 7, 1916	1,891

MINIDOKA PROJECT, IDAHO—JACKSON LAKE ENLARGEMENT.

Aberdeen-Springfield Canal Co.	June 4, 1917	40,000
Bradbury & McMullen	Apr. 23, 1917	200
Burgess Canal & Irrigating Co.	Mar. 28, 1917	5,120
Enterprise Canal Co. (Ltd.)	Apr. 15, 1917	6,100
Harrison Canal & Irrigation Co.	Apr. 5, 1917	5,000
Lowder Slough Canal Co. (Ltd.)	Apr. 15, 1917	1,040
Lyle, W. S.	do	155
Martin Canal Co.	do	1,500
People's Canal & Irrigation Co.	do	8,000
Rudy Irrigation Canal Co.	do	2,000

NORTH PLATTE PROJECT, NEBRASKA-WYOMING.

TRANSFER OF FORMER PERMANANT CONTRACTS.

Transfer of contracts with the Chimney Rock Irrigation & Water Power Co. to the Chimney Rock Irrigation District	Aug. 30, 1916	10,300
Transfer of contract with Goshen Land Co. to the Lingle Water Users' Association	Mar. 9, 1917	32,853

TEMPORARY WATER SUPPLY.

Dawson County Irrigation Co.	Mar. 3, 1917	2,000

STRAWBERRY VALLEY PROJECT, UTAH.

Soldiers Fork unit	Dec. 15, 1916	67.50

LEGISLATION.

Legislation affecting the Reclamation Service since the last annual report includes the following:

The act approved July 8, 1916 (39 Stat., 351), authorizing the Secretary of the Interior to acquire certain rights of way near Engle, N. Mex.

The act approved July 26, 1916 (39 Stat., 390), amending section 14 of the Reclamation Extension Act, providing for the acceptance of that act.

The act approved August 11, 1916 (39 Stat., 506), relative to public lands in irrigation districts.

The act approved August 11, 1916 (39 Stat., 506), providing for the sale of the Boise & Arrowrock Railroad.

The act approved August 17, 1916 (39 Stat., 516), for the relief of certain settlers under the Yuma project.

The act approved September 8, 1916 (39 Stat., 852), authorizing the sale of the unsold and unappropriated portions of lands within the townsite of Newell, S. Dak.

The act approved January 25, 1917 (39 Stat., 868), providing for an auxiliary reclamation project in connection with the Yuma project.

The act approved February 15, 1917 (39 Stat., 920), relative to patents and final water-right certificates.

The act approved February 26, 1917 (39 Stat., 940), authorizing the Secretary of the Interior to sell and convey to the Great Northern Railway Co. certain lands in the State of Montana for divisional terminal yards and other railway purposes.

The appropriation act approved June 12, 1917 (Public No. 21).

Copies of these acts will be found in the appendix.

LAW DECISIONS.

A digest of law decisions affecting the Reclamation Service, which have been rendered during the fiscal year, will be found in the appendix.

PUBLIC NOTICES AND ORDERS.

Copies of the public notices and orders issued by the Secretary in regard to reclamation payments, etc., during the fiscal year will be found in connection with the text relating to the respective projects.

PURCHASES OF RIGHTS AND PROPERTY.

A statement of the transactions for the acquisition of rights and property is given in the appendix.

PERSONNEL.

On June 30, 1917, the force of the Reclamation Service comprised 6,483 persons, subdivided as follows: Educational, 525; noneducational, 1,365; laborers, 4,593. In addition, the employees of contractors working on reclamation projects numbered 667. A more detailed statement, giving the administrative personnel of the service and the number of employees by projects, classified as above, will be found in the appendix.

Wages of labor.—A table in the appendix shows, by projects, the average daily wages paid for common labor in June and December for the past three years, and for June, 1917. This table shows that the average daily wages for common labor have increased from $2.23 in 1914 to $2.63 in 1917. This is an increase of 40 cents, or about 18 per cent, during the three years.

Injuries to employees.—Under the terms of the compensation act of May 30, 1908, 137 injuries to employees were reported during the calendar year 1916 up to September 7, when the employees compensation act (see appendix) superseded the previous act of 1908. The corresponding figure for the calendar year 1915 was 391. In 1916 claims for compensation were allowed in 71 of the cases of reported injury, or 51.8 per cent, and in 1915 in 250 cases, or 63.9 per cent. The average compensation paid for injuries received in 1915 amounted to $148.85, as compared with $145.93 in 1914. Payments have not been completed for injuries received in 1916. Further detailed statistics showing the number of injuries reported, claims allowed, and compensation paid, by projects, since 1908, will be found in the appendix.

Inoculation with typhoid prophylactic.—During the fiscal year the service continued, in cooperation with the War Department, the use of typhoid prophylactic among the field force. Over 300 complete treatments were sent to the field, making a total since July, 1912, of about 3,100. Reaction reports have been received from 1,243 cases. During the fiscal year such reports were received from 139 cases which are summarized in the accompanying table:

	Number of patients.	Reaction.			
		Absent.	Mild.	Moderate.	Severe.
First dose	139	64	66	8	1
Second dose	132	51	64	15	2
Third dose	124	62	51	8	3
Per cent:					
First dose	100	46.0	47.5	5.8	0.7
Second dose	100	38.6	48.5	11.4	1.5
Third dose	100	50.0	41.2	6.4	2.4

As noted in previous reports the slight degree of discomfort accompanying the inoculations is indicated by the fact that, following the first inoculation, the reactions were either entirely absent or mild in character in 93.5 per cent of the cases; after the second inoculation, in 87.1 per cent, and after the third inoculation in 91.2 per cent. Of the 139 employees receiving the treatment, 124 received the full treatment of the three inoculations, 8 received only two inoculations, and 7 only one.

FINANCES.

The financial condition of the service may be summed up in the following condensed statement of total receipts and expenditures. The details of these expenditures are given in the appendix.

The statement of cash receipts and payments appearing below shows that—

At the beginning of the fiscal year there were $2,312,975.54 cash on hand.

During the year this amount was augmented by receipts from various sources to a grand total of $7,676,432.96.

Of the $20,000,000 authorized by the act of June 25, 1910 (36 Stat., 855), $1,500,000 were transferred to the reclamation fund, making a total drawn from the fund to June 30, 1917, $17,000,000.

Cash expenditures during the fiscal year were $8,023,129.93.

Town-site receipts were $31,250.15.

The balance on hand at the close of the fiscal year amounted to $1,935,028.42.

By the processes of the General Land Office and the Treasury Department the receipts from sales of public lands are held in the Treasury from six to nine months before they are placed to the credit of the reclamation fund. Estimated receipts from the sale of public lands in the hands of the Treasury Department on June 30, 1917, which had not been credited to the reclamation fund amounted to approximately $1,300,000.

The reclamation fund, which comprises the moneys received from the sale of public lands, has now reached the total of $91,890,082.85, and from the sale of town sites $333,163.37.

Transfer vouchers, adjusting accounts between the projects for the transfer of the value of services and equipment, amounted to $532,473.21 during the fiscal year 1917. Since the beginning of the service the value of the transfers of supplies, materials, equipment, and services between projects has amounted to $6,084,695.16. This system of transfers between projects has enabled the service to utilize equipment, materials, supplies, etc., to their fullest extent where needed and to charge the cost where the benefit accrued.

CASH TRANSACTIONS.

Below is shown, in the statement of cash receipts and payments, a summation of the cash transactions during the fiscal year 1917:

Statement of cash receipts and payments, fiscal year 1917.

RECEIPTS.

On hand July 1, 1916 (fifteenth annual report, p. 38)		$2,312,975.54
Original receipts:		
Public land sales	$2,925,651.24	
Town-site sales	31,250.15	
Bond loan	1,500,000.00	
		4,456,901.39
Repayment water-right charges		1,175,643.27
Miscellaneous receipts		2,037,839.96
Collection in project offices not classified		6,048.34
		9,989,408.50

PAYMENTS.

From reclamation fund	$6,523,129.93	
Bond loan	1,500,000.00	
		8,023,129.93
Town-site receipts		31,250.15
Balance on hand to June 30, 1917:		
In Treasury	1,130,212.33	
In depositaries to credit of special fiscal agents	798,767.75	
In project offices awaiting remittances	6,048.34	
		1,935,028.42
		9,989,408.50

ASSETS, LIABILITIES, RESERVES, AND CAPITAL.

Below is presented a combined statement of the assets and liabilities, together with the reserves and capital, of the Reclamation Service as of June 30, 1917. This statement shows that the cash resources on June 30, 1917, were $6,292,532.,55 and that all other resources, exclusive of the net expenditure for construction and deferred operation and maintenance charges, amounted to $36,701,357.93. This includes the unaccrued construction charges on contracts with water-right applicants, amounting to $32,477,606.92, as well as the estimated unearned value of construction work contracted, amounting to $1,485,077.66 on June 30, 1917. This latter amount is offset by a contra entry under contingent obligations, as the payment thereof is contingent upon the contractors fulfilling their contracts with the service. The gross expenditures for construction work in process amount to $123,037,579.02, comprising the cost of irrigation works as shown in the statement of construction cost by functional features. From the gross expenditures is deducted all revenue earned during construction to June 30, 1917, amounting to $7,252,315.51, making the net cost of the construction work in process $115,785,263.51. The operation and maintenance deficit amounts in all to $1,612,433.54. The grand total of assets is therefore $160,391,587.53. The liabilities of the service amount in all to $2,857,985.11. The reserves for repayment to the reclamation fund of the cost of the projects amount in all to $42,123,414.77. This contains not only the value of construction contracts with water-right applicants for the original acreage subscribed, but also the acreage on which charges have been temporarily suspended on account of the land becoming waterlogged or temporarily unfit for cultivation by reason of alkali, etc. It also comprises the charges accrued on contracts with the Indian Service and those paid by the Kuhn Irrigation & Canal Co. and the Twin Falls Canal Co. for the construction of the Jackson Lake enlargement work. In addition it includes the amount forfeited, penalties paid, and the construction charges paid in advance by water-right applicants. The latter includes the sum of $714,777.37, which amount covers construction work performed by the Salt River Valley Water Users' Association under contract with the United States for the construction of power plants and canals. It also includes the sum of $52,269, representing credits allowed canal companies and others for canal systems taken over by the Government, both of which are included in the gross construction cost of that project. The capital of the service is represented by the actual receipts from the sale of public lands, amounting in all to $91,890,082.85, plus the estimated amount of $1,300,000, now with the Treasury which has not yet been audited and placed to the credit of the reclamation fund. To this is added the $1,000,000 special appropriation for the Rio Grande Dam (34 Stat., 1357) and the $20,000,000 bond loan authorized by the act of June 25, 1910 (36 Stat., 835), the total capital to June 30, 1917, being $114,190,082.85, plus the net amount of moneys received from the Indian Service for work performed on projects in Montana, $1,177,186.51. This, added to the reserves and liabilities plus revenues in excess of cost of operation and maintenance, amounting to $42,918.29, equals the amount shown above as the assets.

Combined statement of assets, liabilities, reserves, and capital to June 30, 1917.

ASSETS.

I. Cash:			
With Treasurer United States		$1,130,212.33	
With depositaries to credit of special fiscal agents		798,767.75	
Balance of bond loan available for transfer to reclamation fund, act of June 25, 1910 (36 Stat., 835)		3,000,000.00	
Estimated receipts from sales of public land with Treasurer of United States, not yet audited		1,300,000.00	
			$6,228,980.08
II. Collections returnable to fund through Treasury:			
In special fiscal agent's possession, awaiting remittance		1,541.15	
In other employee's hands, awaiting transfer to special fiscal agents		4,507.19	
Cash in special deposit account		57,504.13	
			63,552.47
III. Inventory of stock on hand:			
Stores issued and not used		931,328.57	
Storehouse stock		501,691.13	
Goods in transit		70,449.99	
Equipment adjustment account		37,454.92	
Freight and handling on inventory property		[1] 9,260.08	
			1,531,664.53
IV. Accounts receivable:			
Construction charges due and uncollected from water-right applicants		420,020.55	
Construction charges unaccrued on contracts with water-right applicants		32,477,606.92	
Operation and maintenance charges due and uncollected from water-right applicants		419,756.93	
Uncollected rentals of irrigation water		148,878.25	
Uncollected freight refunds		12,165.87	
Other uncollected items unclassified		189,534.87	
Unadjusted transfers to other projects		16,652.35	
			33,684,615.74
V. Construction work contracted:			
Unearned value of construction work contracted		1,397,952.26	
Estimated engineering expenses on construction work contracted		87,125.40	
			1,485,077.66
VI. Construction work in process:			
Gross cost of construction of projects to date		115,666,447.50	
Gross operation and maintenance cost during construction		6,149,265.26	
Gross cost of producing commercial power during construction		28,441.38	
Undistributed clearing accounts		70,129.49	
Plant accounts		1,123,295.39	
		123,037,579.02	
Less revenues earned during construction, as follows:			
Rentals of buildings	$228,949.07		
Rentals of grazing and farming lands	170,063.02		
Rentals of power and light	685,688.01		
Rentals of irrigation water	3,913,031.53		
Rentals of telephones and tolls	13,766.33		

[1] Deduct.

VI. Construction work in process—Continued.			
Less revenue earned during construction, etc.—Contd.			
Contractors' freight refunds.	$229,204.72		
Forfeitures by defaulting bidders and contractors...	136,479.54		
Other revenues, unclassified.	291,282.51		
Less cost adjustments—			
Profit on mess house operations	103,209.11		
Profit on mercantile store operations	338,541.00		
Profit on hospital operations.	26,836.33		
Miscellaneous	1,115,264.34		
Total deductions		$7,252,315.51	
Net cost of construction of projects to date			$115,785,263.51
Operation and maintenance deficit			1,612,433.54
Total assets			160,391,587.53

LIABILITIES, RESERVES, AND CAPITAL.

VII. Accounts payable:			
Unpaid progress earnings under construction contracts		$184,809.65	
Unpaid contract holdbacks		139,227.34	
Unpaid labor		315,499.13	
Unpaid purchases		306,319.30	
Unpaid freight and express charges		171,031.96	
Unpaid passenger fares		11,641.16	
Unpaid agreements to purchase real property		32,060.47	
Unredeemed coupon books		3,069.28	
Unredeemed meal tickets		1,310.17	
Unadjusted transfers from other projects		6,728.39	
Guarantee and special deposits		55,508.13	
Other unpaid items unclassified		145,702.47	
			$1,372,907.45
VIII. Contingent obligations:			
Unearned value of construction work contracted		1,397,952.26	
Estimated engineering expenses on construction work contracted		87,125.40	
			1,485,077.66
IX. Reserves for repayment to reclamation fund of cost of projects:			
Value of construction contracts with water-right applicants		36,792,171.34	
Value of construction contracts with water-right applicants, temporarily suspended		862,103.80	
Construction charges paid in advance by water-right applicants		191,331.27	
Construction charges paid and forfeited by water-right applicants		33,284.25	
Penalties paid on construction charges by water-right applicants		42,614.40	

MISCELLANEOUS ACCRUALS.

Charges accrued on contracts with Indian Service		2,890,518.90	
Charges accrued on Jackson Lake enlargement work		785,571.39	
Receipts from sale of stored water		53,608.65	
Net power revenues		120,106.09	
Receipts from sale of town lots		312,830.88	
Net grazing revenues		39,273,80	
			42,123,414.77

X. Capital:		
Reclamation fund	$92,223,246.22	
Less town-site receipts	333,163.37	
		$91,890,082.85
Rio Grande Dam appropriation (34 Stat., 1357)		1,000,000.00
Bond loan (36 Stat., 835)		20,000,000.00
Estimated reclamation fund with Treasurer United States not yet audited		1,300,000.00
Indian moneys spent by Reclamation Service during year taken into the account as shown by tables		1,177,186.51
		$115,367,269.36
Revenues in excess of cost of operation and maintenance		42,918.29
Total liabilities, reserves, and capital investment of the Government		160,391,587.53

CONSTRUCTION COSTS BY FEATURES.

The statement which follows gives by features the cost of the construction of all storage works, canal systems, lateral systems, drainage and other protection systems, power systems, and other construction accounts of all projects, including the Blackfeet, Flathead, and Fort Peck Indian projects.

Consolidated statement of construction expenditures and revenues.

Feature.	Fiscal year 1917.	To end of fiscal year 1917.
EXPENDITURES.		
Examination and surveys	$61,463.87	$3,278,004.09
Storage works	934,647.71	32,284,728.32
Pumping for irrigation	89,390.41	1,058,823.27
Canal system	1,792,180.59	43,748,052.03
Lateral system	1,744,747.17	19,237,708.17
Drainage system	733,271.00	3,832,490.86
Flood protection	212,039.74	2,724,329.31
Power system	172,559.55	5,719,073.05
Farm units	37,869.37	473,157.32
Permanent improvements	216,743.67	2,678,670.05
Telephone system	21,185.75	462,132.40
Supplemental construction	56.52	51,875.72
Operation and maintenance charges compounded with construction	11,427.81	117,402.91
Operation and maintenance during construction	1,113,643.50	6,149,265.26
Cost of producing commercial power	901.24	28,441.38
Undistributed clearing accounts	70,129.49	70,129.49
Plant accounts	196,222.59	1,123,295.39
Gross construction cost	7,408,479.98	123,037,579.02
REVENUES.		
Rental of buildings	5,779.73	228,949.07
Rental of grazing and farming lands	15,522.22	170,063.02
Rentals of power and light	294,579.14	685,688.01
Rental of irrigation water	727,641.42	3,913,031.53
Rental of telephone and tolls	631.84	13,766.33
Contractor's freight refunds	25,884.77	229,204.72
Forfeitures by defaulting bidders and contractors	20,715.07	136,479.54
Other revenues unclassified	129,608.04	291,282.51
Profit on mess-house operations	[1] 48,666.74	103,209.11
Profit on mercantile-store operations	5,574.12	338,541.00
Profit on hospital operations	4,171.20	26,836.33
Profit on railroad operations	1,987.02	[1] 1,862.71
Profit on farming operations	[1] 8,213.64	[1] 8,213.64
Other profits on operations, unclassified	4,999.35	18,046.06
Joint construction of power plant, Salt River project		714,777.37
Total	1,180,213.54	6,859,708.25
Amounts set up as reserves or depreciation, charged to cost and not expended	72,032.70	392,517.26
Gross revenues	1,252,246.24	7,252,315.51
Net cost of construction to June 30, 1917		115,785,263.51

[1] Deduct.

OPERATING REVENUES AND EXPENSES.

There follows a combined statement giving the revenues and expenses for the operation of projects which have been opened by public notices of the Secretary of the Interior. These revenues and expenditures are those resulting from operations connected with the lands thrown open to water-right applicants by these public notices and do not include the transactions resulting from the temporary operation of canals during the construction period.

Consolidated statement of operating expenses and revenues.

EXPENSES.

Feature.	Fiscal year 1917.			To end of fiscal year 1917.		
	Operation.	Maintenance.	Total.	Operation.	Maintenance.	Total.
Storage works	$46,670.92	$28,328.05	$74,998.97	$202,034.69	$248,949.96	$450,984.65
Pumping for irrigation	20,265,64	[1] 29,041.09	[1] 8,775.45	360,547.56	103,910.72	464,458.28
Canal system	55,915.89	143,679.07	199,594.96	449,116.93	980,669.36	1,429,786.29
Lateral system	186,112.28	323,735.67	509,847.95	1,058,419.33	1,981,585.01	3,040,004.34
Drainage system	3,379.33	25,067.66	28,446.99	30,936.84	138,691.29	169,628.13
Flood-protection system		782.16	782.16		12,971.90	12,971.90
Power operation				9,330.54		9,330.54
Undistributed expense	[1] 84,487.82	[1] 61,037.65	[1] 145,525.47	54,233.22	229,338.82	283,572.04
Plant accounts	164.35	7,898.26	8,062.61	164.35	18,510.74	18,675.09
Supplemental construction chargeable to operation and maintenance		46,891.75	46,891.75		64,564.46	64,564.46
Total	228,020.59	486,303.88	714,324.47	2,164,783.46	3,779,192.26	5,943,975.72

[1] Deduct.

REVENUES.

Item.	Fiscal year 1917.	To end of fiscal year 1917.
Operation and maintenance charges accrued on contracts with water-right applicants	$581,309.47	$3,429,190.49
Operation and maintenance charges paid in advance by water-right applicants	[1] 3,186.72	6,700.39
Operation and maintenance charges paid and forfeited by water-right applicants	1,065.62	11,652.70
Penalties on operation and maintenance charges accrued on contracts with water-right applicants	11,326.71	23,432.02
Discount allowed on operation and maintenance charges accrued on contracts with water-right applicants (contra)	[1] 13,633.75	[1] 25,469.72
Rental of land and buildings during operating period	7,629.87	36,719.12
Rental of grazing and farming land during operating period	1,320.17	3,057.92
Rentals of power and light during operating period	[1] 86,445.21	1,890.35
Rental of irrigation water	44,853.39	364,135.88
Rental of telephone and tolls during operating period	217.91	788.40
Accrued and unpaid operation and maintenance accruals transferred to and added to construction charges	[1] 72,168.60	482,934.08
Other revenues unclassified, earned during operating period	[1] 76,910.87	39,428.84
Total	395,377.99	4,374,460.47
Difference (deficit)	318,946.48	1,569,515.25

[1] Deduct.

REPAYMENT CONTRACTS.

The development of the projects has resulted in water-right applications or contracts that have been entered into with settlers, providing for repayment to the Government of the cost of constructing the works for irrigating their lands. These contracts, under pro-

visions of the original reclamation law, require complete repayment of construction charges in 10 annual installments, but the reclamation extension act gives such of those as accept its terms and to those who had not executed the 10-year contracts the right to repay in 20 years in annual installments, so graduated as to place upon the irrigator a minimum burden during the early years of farm development. On 18 projects the lands have been opened to entry and settlement and the construction charges fixed by public notice. Contracts with water-right applicants for repayment to the reclamation fund of the cost of projects total $37,654,275.14. Of this amount there has been collected $4,796,724.91 of the charges, leaving the unpaid value of these contracts on June 30, 1917, $32,857,550.23.

There are still large acreages of land on most of the projects to which the service is now ready to furnish irrigation water and which are being taken up from day to day and new contracts signed. On all the projects the present net investment of the Government exceeds the asset value of the contracts. When all of the lands susceptible of irrigation are covered by contracts, the value of the contracts on any project should equal the amount of the total investment thereon. It is to be noted in this connection, however, that on several of the projects additional investment will be necessary to make all of the lands irrigable.

ESTIMATED COST OF CONTEMPLATED WORK.

It is estimated that there will be expended during the fiscal year 1918 the sum of $7,868,335. The following table gives the tentative distribution of this amount to the various functional features of all projects, including the Blackfeet, Flathead, and Fort Peck Indian projects. The details are given under a similar heading for each project.

Consolidated statement of estimated cost of work contemplated during fiscal year 1918.

Examination and surveys	$75,950.00
Storage works	1,401,700.00
Pumping for irrigation	150,900.00
Canal system	1,260,600.00
Lateral system	1,659,804.00
Drainage system	682,531.00
Flood protection	184,400.00
Power system	30,000.00
Farm units	114,100.00
Permanent improvements	65,300.00
Telephone system	30,400.00
Operation and maintenance during construction (water-rental)	366,750.00
Operation and maintenance under public notice	1,604,600.00
Stores and other operations	63,400.00
Plant and equipment	127,900.00
Secondary projects	50,000.00
Total	7,868,335.00

GENERAL FINANCIAL DATA FOR ALL PROJECTS.

The following statement shows general financial data for all projects:

Gross construction cost to June 30, 1917	$123,037,579.02
Appropriation for fiscal year 1918, total	8,227,000.00
Allotment for construction, fiscal year 1918	6,866,100.00

Appropriation fiscal year 1917		$8,884,000.00
Expenditures during fiscal year chargeable to 1917 appropriation	$6,468,599.83	
Registered liabilities chargeable to 1917 appropriation	933,973.73	
Contract obligations wholly covered by 1917 appropriation	1,153,194.42	
Estimated engineering expense on contract work wholly covered by 1917 appropriation	87,125.40	
		8,642,893.48
Unencumbered balance July 1, 1917		241,106.52

COST OF INVESTING THE RECLAMATION FUND.

In the thirteenth annual report there was for the first time presented a statement of the general expenses by calendar years showing the gross expenditures and the ratio of the general expense thereto. The figures shown for general expense were estimates based on partial returns from an investigation instituted to determine the ratio of general expense to all other expenditures. These accounts, as presented in the thirteenth annual report, had been kept by calendar years, but owing to the change of policy involving annual appropriations by fiscal years, a readjustment of these accounts was immediately undertaken.

There is presented herewith a statement showing by fiscal years the actual gross expenditures from the reclamation fund and the actual total amount of general expense, together with the ratio of general to all other expenditures. The results shown by this table differ somewhat from those given in the table of estimates presented in the thirteenth annual report. By reference to the table which follows it will be found that the average cost of investing $100 in the construction and maintenance of the permanent works of the Reclamation Service has been $8.75 during the past 15 fiscal years.

Statement showing, by fiscal years, the gross expenditures from the reclamation fund less general expense, the total amount of general expenses of the service, and the ratio of general expenses to all other expenditures.

Fiscal year.	Gross expenditures exclusive of general expense.	General expense.	Ratio of general to all other expenditures.
1903	$245,548.27	$23,546.20	9.59
1904	1,395,178.17	118,253.05	8.48
1905	3,450,812.79	319,384.44	9.25
1906	7,007,285.71	546,237.15	7.79
1907	12,188,889.67	755,164.91	6.19
1908	11,358,174.72	792,970.33	6.98
1909	10,037,536.09	887,484.08	8.84
1910	9,543,060.87	873,496.00	9.15
1911	9,100,885.25	897,501.27	9.86
1912	11,316,314.42	892,565.41	7.89
1913	8,507,467.36	958,443.72	11.27
1914	10,055,187.91	1,002,333.39	9.97
1915	14,583,178.54	1,058,809.24	7.26
1916	10,110,983.77	1,077,485.42	10.65
1917	10,088,392.04	1,080,303.78	10.71
Total	128,988,895.58	11,283,978.39	8.75

DISCUSSION OF PROJECTS.

PRIMARY PROJECTS.

(For detailed tables on cement, unit bids and contract prices, engineering data for projects on completion, summary of results to June 30, 1917, crops, finances, etc., see appendix.)

ARIZONA, SALT RIVER PROJECT.

WILLIAM S. CONE, project manager, Phoenix, Ariz.

LOCATION.

Counties: Maricopa and Gila.

Townships: 2 S. to 3 N., Rs. 1 to 6 E. and 1 W., and Tps. 3 to 5 N., Rs. 11 to 14 E., Gila and Salt River base and meridian.

Railroads: Santa Fe, Prescott & Phoenix; Arizona Eastern.

Railroad stations and other towns, showing estimated population January 1, 1917: Phoenix, 25,000; Mesa, 3,000; Glendale, 1,200; Tempe, 2,000; Chandler, 600; Peoria, 300; Gilbert, 50; Scottsdale, 50; Higley, Lehi, Tolleson, Alhambra, Cashion, and Laveen, each about 25.

WATER SUPPLY.

Source of water supply: Salt and Verde Rivers and wells in various parts of the valley.

Area of drainage basins at Granite Reef Dam: Salt River, 6,250 square miles; Verde River, 6,000 square miles.

Annual run-off in acre-feet: Salt River at Roosevelt (5,760 square miles), 1889 to 1916, maximum 3,226,000, minimum 153,394, mean 865,853; Verde River at McDowell (6,000 square miles), 1889 to 1916, maximum 1,822,000, minimum 116,679, mean 560,560.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which service is prepared to supply water, season of 1917: 192,077 acres, entitled to permanent water, including private, homestead, and school lands, and townsites; and 20,889 acres entitled to temporary water service.

Area under rental contracts, season of 1917: 199,614 acres (on June 30, 1917).

Length of irrigating season: 365 days, October 1 to September 30.

Rainfall on irrigable area: 33-year period, average, approximately 8 inches. Calendar year 1916, 6.76 inches.

Average elevation of irrigable area: 1,200 feet above sea level.

Range of temperature on irrigable area: 22° to 117° F.

Character of soil of irrigable area: Sandy loam, with clay in places.

Principal products: Alfalfa, grain, cotton, olives, citrus and deciduous fruits, and live stock.

Principal markets: Phoenix and other Arizona towns, Pacific coast cities, and eastern markets.

LANDS OPENED FOR IRRIGATION.

Public notices: January 18, May 19, 1917.

All lands will be irrigated under rental contracts until after the close of the current irrigation season, September 30, 1917.

CHRONOLOGICAL SUMMARY.

Reconnoissance made and preliminary surveys begun: 1902.
Construction recommended by the director: March 7, 1903.
Construction conditionally authorized by the Secretary: March 14, 1903.
Grand, Water Power, Salt River Valley, Maricopa, and Joint Head Canals purchased: June 15, 1906.
Intake Dam for Power Canal completed: October, 1906.
Power Canal completed: October, 1906.
Irrigation by the Reclamation Service begun: May 15, 1907.
Granite Reef Dam completed: August, 1908.
South Canal completed: June, 1909.
Eastern Canal completed: December, 1909.
Roosevelt Dam completed: February 5, 1911; formal dedication, March 18, 1911.
San Francisco pumping plant completed: October, 1911.
South-Consolidated power plant, operation commenced: October 23, 1912.
Arizona Falls power plant, operation commenced: May, 1913.
Western Canal completed and operation commenced: February 16, 1913.
Mesa District pumping plants (Batteries A, B, C, D, E, F), drilling commenced: December, 1908; final installation completed, June, 1913.
Highline pumping plant put in operation: June, 1913.
Highline Canal completed and operation commenced: June 16, 1913.
Raising of spillways, Roosevelt Dam, completed: August, 1913.
Joint Head Dam completed: March, 1914.
Reconstruction of the Arizona Canal completed: February, 1915.
McQueen pumping plant completed: March, 1915.
Farm unit survey completed: April, 1915.
Water over spillways of Roosevelt Reservoir: April 14, 1915; January–May, 1916.
Survey for silt deposit in Roosevelt Reservoir: June, 1915.
South Side Canal system completed: June, 1915.
Installation of sixth unit, Roosevelt power plant, completed: November, 1915.
Cross Cut power plant completed: December, 1915.
Project 100 per cent completed: June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the Salt River project provides for the storage of water in the reservoir created by the building of the Roosevelt Dam, which is situated at the confluence of Tonto Creek and Salt River, about 70 miles northeast of Phoenix, Ariz. This stored water is carried down Salt River to a point about 4 miles below the mouth of the Verde River, where, together with such water as may be discharged by the Verde, it is diverted to the North and South side canal systems by the Granite Reef Diversion Dam. The water supply for the canals on the north side of the river is further augmented by the water diverted by the Joint Head Diversion Dam.

There have been completed and put into operation nine pumping plants with an approximate capacity each of 10 second-feet. A pumping plant located at the junction of the Western Canal and the Kyrene branch pumps water through a 54-inch pressure pipe 5,930 feet long to an elevation of 40 feet and waters approximately 7,500 acres of land. The United States claims all waste, seepage, unappropriated springs, and percolating water arising within the project, and proposes to use such water in connection therewith.

The canal and lateral system at present comprises 815.5 miles, and on completion of the project provides for the delivery of water to each 160-acre tract of irrigable land.

A power plant located at Roosevelt generates power from stored water in the reservoir and from water delivered from the Power Canal, heading at a diversion dam in Salt River, 19 miles above the storage dam. Three other power plants have been constructed by the water users' association and have become a part of the project, viz, the South-Consolidated, the Arizona Falls, and the Cross Cut. A portion of the power developed will be used for pumping water for irrigation and the remainder for industrial purposes.

The principal features are the Intake Dam and Power Canal, the Roosevelt Dam, Granite Reef Dam, Joint Head Dam, the main canals of the distributing system and the greater part of the lateral system, and the power system, comprising four power plants, transformer house, transmission lines, switching station, and four substations. Some work remains to be done on the sluicing tunnel through the Roosevelt Dam, and rather extensive repairs are now needed on the Intake Dam and Granite Reef Dam.

SUMMARY OF GENERAL DATA FOR SALT RIVER PROJECT TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is complete		[1] 192,077
Public land entered to end of fiscal year	16,170	
State land	11,030	
Private land	164,877	
Acreage service could have supplied season of 1916		[2] 212,960
Estimated acreage service can supply July 1, 1918		[1] 192,077
Acreage actually irrigated, season of 1916		187,905
Acreage cropped under irrigation, season of 1916		[3] 173,359
Crops:		
Value of irrigated crops, season of 1916		$8,435,719.00
Value of irrigated crops per acre cropped		$48.65
Finances:		
Gross construction cost to end of fiscal year		$14,440,874.47
Per cent complete at end of fiscal year		100
Appropriated for fiscal year 1918, total		[4] $458,000.00
Allotment for construction, fiscal year 1918		$73,000.00
Estimated gross construction expenditures to June 30, 1919		$14,513,874.47
Announced construction charges per acre		$60.00
Appropriation, fiscal year 1917		[5] 1,392,555.26
Expenditures during fiscal year, chargeable to 1917 appropriation—		
Disbursements and transfers	$749,704.44	
Registered liabilities chargeable to 1917 appropriation	54,797.19	
Contract obligations wholly covered by 1917 appropriation	42,823.00	
		847,324.63
Unencumbered balance July 1, 1917		545,230.63
Repayments:		
Water rental charges—		
Accrued to end of fiscal year		1,988,989.73
Collected to end of fiscal year		1,981,211.33
Uncollected at end of fiscal year		7,778.40
Power earnings—		
Accrued to end of fiscal year		1,198,282.49
Collected to end of fiscal year		1,148,385.40
Uncollected at end of fiscal year		49,897.09
Drainage: Cost of drainage works to end of fiscal year (investigations)		7,160.87

[1] Area entitled to permanent water right.
[2] Includes so-called "dry lands" given right to rent water temporarily on account of full reservoir.
[3] Excluding 10,379 acres for which water was bought, but no crop reported, largely pasture.
[4] Under authority of the sundry civil act of June 12, 1917, an additional sum equal to 10 per cent of this amount has been allotted, making a total of $503,800 available for the fiscal year 1918.
[5] Includes balance of 1916 appropriation and refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

CONSTRUCTION DURING FISCAL YEAR.

ROOSEVELT DAM.

Spillways.—The work of repairing the spillways and protecting them from further damage was commenced July 25, 1916. The concreting of the spillways, discontinued in January, 1916, was completed, and the lower south spillway channel cleared and excavated to a section and grade expected to give an unobstructed passage to the spillway water and prevent it from backing up in the tailrace, or swirling at the base of the spillway cliff. The river channel was also cleared of débris and lowered for the same purpose, the excavated material being placed in the banks of the spillway channel.

The faces and upper channels of the two spillways were concreted where considered advisable to prevent further disintegration of the rock. The lower south spillway channel was paved with rock and then lined with concrete, the parts subjected to high impact being reinforced with old steel cables remaining from the construction of the dam. The overhanging cliffs were trimmed down where the overhang was dangerous and liable to drop into the spillway channels, and the material thus obtained was used in building the banks on each side of the lower spillway channel. In the upper north spillway channel reinforced concrete guide walls were built to deflect the water from its usual contracted channel over the north tunnel outlet, and with a flow of 2 feet over the spillway in May, 1917, the effect of these walls was all that could be desired, as they distributed the flow evenly over the entire width of the channel.

Quantities and costs to June 30, 1917: 35,710 cubic yards rock, $66,090; 9,279 cubic yards concrete, $132,470.

South sluicing tunnel and 7-foot penstock connection.—The two 48-inch riveted steel pipe lines, which will connect the 38-inch emergency valves to the new 38-inch needle valves and the 7-foot penstock, were completed to the penstock connection; 150 cubic yards of rock were excavated in driving the tunnel to the 7-foot penstock, and the connection was 90 per cent completed by the end of the fiscal year. The total expenditures for the south sluicing tunnel amounted to $50,876, which includes the cost of concreting the operating chamber for the emergency valves, completed in May, and the excavation of the new outlet of the south tunnel, which was 60 per cent complete June 30, 1917.

North tunnel outlet.—3,700 cubic yards of rock were trimmed off the cliff over the new north tunnel outlet, and the excavation of the new outlet was started in May, 1917. At the end of the fiscal year the top heading was driven to within 20 feet of the old tunnel and the excavation of the operating chamber was about 75 per cent complete. The total amount of rock excavated from the new tunnel outlet in the fiscal year was 550 cubic yards at a cost of $3,463.

Roosevelt power house.—Work on the two-story concrete storeroom at the east end of the power house was started in June, 1917. The foundations were prepared and the reinforcing steel cut and bent.

GRANITE REEF DAM.

The repairs to the apron and sluiceways at Granite Reef Dam and the construction of the new wing wall on the north side were completed in August, 1916.

BOARDS OF ENGINEERS.

Date.	Topic.	Personnel.
Sept. 10, 1916	Inspection of flood conditions and progress of work at Roosevelt Dam.	E. H. Baldwin, W. S. Cone.
Oct. 30, 1916	Protection work to be done at Roosevelt, work on North Tunnel and sluicing tunnel, and possible protection of project lands and canals from Cave Creek floods.	A. P. Davis, F. E. Weymouth, W. S. Cone, Walter Ward.

DRAINAGE.

No actual drainage work has been done by the Reclamation Service, but investigations have been carried on during the entire year and profiles kept of the underground water level as shown in various wells, which are read each month. These investigations are being carried on in the North Side, South Side, and Grand districts.

From May, 1916, to May, 1917, the water level in these wells rose as follows:

District.	Rise of water level.
	Feet.
Grand	2
South Side	0.75
North Side	(1)

[1] Practically no rise.

OPERATION OF POWER SYSTEM.

The Roosevelt plant was operated continuously during the year. Units 1, 2, and 3 were not in service during the year, as the connection from the sluicing tunnel to the power canal penstock, which will supply these units with water from the reservoir, was not completed. A machine-shop platform was built in the northeast corner of the power house over the 10-foot penstock. A new discharge pipe for the synchronous bypass valve on unit No. 6 was installed. Control cables, replacing those destroyed by the flood, were strung between the power house and the transformer house. The water surface in the tailrace was lowered to elevation 10.5 by excavating a channel through the rock which had been deposited in the river bed by the flood in January, 1916.

The Cross Cut, South-Consolidated, and Arizona Falls plants were operated as continuously as the flow of water in the canals would allow. Two of the generator windings at the Cross Cut plant were punctured by lightning during September. Grounding switches were ordered, and when installed will protect these machines from further damage.

The load on the system has been increased during the year by the addition of nine pumping plants of the Southwest Cotton Co., south of Chandler, and by additional load at the Inspiration Consolidated Copper Co. The maximum observed output during the year was 12,900 kilowatts. The gross income from the sale of power for the year was $491,812.51.

OPERATION AND MAINTENANCE.

There were no extensions or additions to the Salt River project unit during the fiscal year 1917, and the features operated and maintained were the same as for the previous year—viz, the Roosevelt Reservoir, Roosevelt Storage Dam, Granite Reef and Joint Head Diversion Dams, the Arizona, Grand, Maricopa, and Salt River Valley Canals and laterals on the north side of Salt River, and the South, Eastern, Main Consolidated, East Branch Consolidated, Mesa, San Francisco, Western, and Highline Canals and laterals on the south side. Nine batteries were operated on the south side with electric power from the project power system.

At the close of the fiscal year there were 199,614 acres of land entitled to water service under rental contracts. This figure includes town sites on the project and land under temporary water-rental contract, covered by 4,284 water-rental applications.

For a period of 48 days from April 20, 1917, to and including June 6, water ran over one spillway of the Roosevelt Dam. The maximum elevation of water was reached on May 7, 1917, when the gage read 227.03 feet, and the contents of the reservoir amounted to 1,401,786 acre-feet. The minimum reading of the year was taken on October 8, 1916, when the gage recorded 207.18 feet of water, the contents amounting to 1,083,574 acre-feet. On July 1, 1916, the gage reading was 219.28 feet and on June 30, 1917, the height was 219.35, showing a gain of 0.07 of a foot, or 11.19 acre-feet of water between the first and last days of the fiscal year.

The regular thorough cleaning of the main canals was done during the winter months when the water could be kept out of the canals without serious detriment to farmers. Regular maintenance work during the year was carried on by three camps on the north side, two on the Mesa district of the south side, and one on the Western and Highline Canals. Three bands of sheep and two of goats were used on the canals and laterals except for about 60 days during the winter, when there was no growing vegetation, and they were pastured on milo maize stubble. The mileage of the canals at the end of the irrigation year, as shown by the operation and maintenance report, amounted to 815.5 miles.

The contract rates in effect at the close of the 1916 season were changed at the commencement of irrigation season December 1, 1916, the new rates effective at that time being $1 per acre-foot for the first acre-foot per acre, 60 cents for the second and third, and 75 cents for the fourth and all in excess of this amount. These rates were effective on all gravity canals. On the Highline Canal, where the water is lifted 40 feet, a flat rate of $1.25 per acre-foot was made.

Owing to the entrance of the United States into the European conflict, steps were taken as early as April 11, 1917, to serve all possible lands under the project with water, and during the season

temporary water-rental contracts were made covering approximately 3,750 acres of land classed as uncultivated by the report of the board of survey. Certain restrictions were necessary owing to the fact that certain canals have no additional capacity. Under these conditions no new lands were taken in under the Salt River Valley and Highline Canals, and only half the acreage applied for under the Eastern Canal, but on all other canals contracts were made for the acreage applied for, unless there was some special reason why deliveries could not be made.

Historical review, Salt River project.

	1912	1913	1914	1915	1916	1917
Acreage for which service was prepared to supply water	160,000	190,000	187,112	192,000	[1] 212,930	[2] 192,000
Acreage irrigated	128,628	163,312	187,112	192,000	187,905	199,614
Miles of canal operated	576	715	715	782.6	806.25	815.5
Water diverted (acre-feet)	663,266	770,063	804,924	831,438	996,600	1,036,615
Water delivered to land (acre-feet)	430,928	462,037	446,730	498,862	677,688	704,898
Per acre of land irrigated (acre-feet)	3.94	2.97	2.62	2.66	3.58	2.83

[1] Includes so-called "dry lands" given right to rent water temporarily on account of full reservoir.
[2] Area entitled to permanent water right.

SETTLEMENT.

There was an inclination toward smaller holdings during the year, some of the large ranches being subdivided. The settlement of Russians increased considerably. No lands were opened for entry.

Farmers were unusually prosperous owing to the high prices of farm produce and dairy products. Splendid exhibits of horses, sheep, hogs, poultry, and dairy stock, and all kinds of farm produce were shown at the State fair held in Phoenix during the fall of 1916. Cooperative organizations in nearly every line of farm work have been formed and are reported to be doing effective work.

Settlement data, Salt River project.

Items.	1913	1914	1915	1916	1917
Total number of farms on project	2,680	3,068	3,600	3,004	[1] 4,284
Population	20,000	20,500	22,000	22,000	22,000
Number of irrigated farms	2,680	3,068	3,600	3,004	4,284
Operated by owners or managers	1,945	2,459	2,700	2,333	2,570
Operated by tenants	735	609	900	671	1,714
Population	20,000	20,500	22,000	22,000	22,000
Number of towns	11	11	12	12	14
Population	26,600	30,500	31,000	31,000	32,350
Total populations in towns and on farms	46,600	51,000	53,000	53,000	54,350
Number of public schools	52	60	60	60	60
Number of churches	48	50	50	50	50
Number of banks	11	11	12	10	11
Total capital stock	$925,100	$798,500	$828,500	$1,333,500	$1,162,000
Total amount of deposits	$7,986,234	$8,353,519	$9,000,000	$7,189,265	$10,368,619

[1] Shown as number of water-rental applications instead of land owners as in previous years.

PRINCIPAL CROPS.

Most of the new land prepared in the spring of 1917 was planted to milo maize. Owing to the high prices received for the cotton crop of 1916 the area planted this year is approximately 25,000 acres, most of which is long staple. Some alfalfa was plowed up in order

to put in cotton. At the close of the year all cotton under the project is reported in fine condition and heavy yields are expected. The yield from about 1,200 acres of cantaloupes was very good, but as the Southern California crop was late and conflicted with the marketing of the Salt River production, returns from Eastern shipments will not be so good as last year. Grain crops are reported as yielding well. Approximate figures on barley are 20,000 acres; wheat, 6,000 acres; and oats, 1,500 acres. Alfalfa yield and prices were slightly better than last season, the acreage being in the neighborhood of 113,000 acres. Of fruits there are about 1,300 acres of citrus, 1,400 acres of deciduous, and 500 acres of other small fruits in yielding orchards and about 1,000 acres of young trees.

Crop report Salt River project, Arizona, year ending Nov. 30, 1916.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa	81,616	Tons	326,464	4	$12.00	$3,917,568	$48
Alfalfa seed	2,739	Bushels	10,956	4	7.20	78,883	29
Barley	13,295	do	332,375	25	1.05	348,994	26
Beans	710	do	14,200	20	3.60	51,120	72
Cantaloupe	1,584	Pounds	7,920,000	5,000	.03	237,600	150
Corn, broom	55	Tons	27.5	½	125.00	3,438	62
Corn fodder	2,080	do	16,640	8	5.00	83,200	40
Corn, Indian	984	Bushels	34,440	35	1.00	34,440	35
Corn, sorghum	28,589	Tons	35,736	1¼	30.50	1,089,948	38
Cotton, long staple	5,477	Pounds	1,916,950	350	.35	670,932	122
Cotton, short staple	556	do	194,600	350	.17	33,082	59
Fruits, citrus [1]	1,259	do	2,518,000	2,000	.05	125,900	100
Fruits, deciduous [2]	1,248	do	4,992,000	4,000	.025	124,800	100
Fruits, small [3]	490	do	980,000	2,000	.06	58,800	120
Garden [4]	623					62,300	100
Hay, grain	6,061	Tons	12,122	2	12.00	145,464	24
Oats	1,425	Bushels	57,000	40	.50	28,500	20
Olives	427	Pounds	512,400	1,200	.05	25,620	60
Pasture	52,822					950,796	18
Potatoes, common	351	Bushels	21,060	60	1.50	31,590	90
Potatoes, sweet	102	do	7,650	75	1.50	11,475	112
Watermelons	962	Tons	3,144	12	10.00	31,440	120
Wheat	10,081	Bushels	252,025	25	1.15	289,829	29
Total	212,836						
Less duplicated areas	39,477						
Total cropped acreage	173,359						
Total and average						8,435,719	48.65

		Areas.	Acres.	Farms.	Per cent of project.
Irrigated, no crops:					
Young citrus	492	Total irrigable area of Salt River project.	[5] 219,690.72		100.00
Young olives	220	Total irrigable area farms reported	194,866.00	4,289	88.7
Young deciduous	586	Total irrigable area of townsites	4,980.17	[6] 31	2.26
Miscellaneous	2,869	Total irrigated area farms reported under rental contracts.	187,905.08	4,289	85.53
Total	177,526	Total cropped area farms reported	173,359.00	4,289	78.91
Water bought; no crop reported. [7]	10,379				
Total	187,905				

[1] Citrus fruits, 1,259 acres (naval oranges, 1,018 acres; Valencia oranges, 29 acres; grape fruit, 212 acres.
[2] Deciduous fruits, 1,248 acres (apricots, 423 acres; peaches, 716 acres; pears, 108 acres).
[3] Small fruits, 490 acres (small fruits, 303 acres; grapes, 187 acres).
[4] Garden, 623 acres, includes 57 acres of lettuce.
[5] Total within boundary lines of project.
[6] Town sites.
[7] Probably largely pasture.

PUBLIC NOTICES AND ORDERS.

PUBLIC NOTICE, *January 18, 1917.*

1. In pursuance of the provisions of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388) and acts amendatory thereof and supplemental thereto, and particularly the reclamation extension act of August 13, 1914 (38 Stat., 686) notice is hereby given that water will be furnished from the Salt River project, Arizona, in the irrigation year beginning October 1, 1917, and ending September 30, 1918, and each irrigation year thereafter upon the filing of proper water-right applications for the irrigable lands in the said project shown on the following farm unit plats, viz:

Gila and Salt River base and meridian.—T. 1 S., R. 1 E.; T. 1 S., R. 2 E.; T. 1 S., R. 3 E.; T. 1 S., R. 4 E.; T. 1 S., R. 5 E.; T. 1 S., R. 6 E.; T. 2 S., R. 5 E.; T. 2 S., R. 6 E.; T. 1 N., R. 1 E.; T. 1 N., R. 2 E.; T. 1 N., R. 3 E.; T. 1 N., R. 4 E.; T. 1 N., R. 5 E.; T. 1 N., R. 6 E.; T. 2 N., R. 1 E.; T. 2 N., R. 2 E.; T. 2 N., R. 3 E.; T. 2 N., R. 4 E.; T. 2 N., R. 6 E.; T. 3 N., R. 1 E.; T. 3 N., R. 2 E.; T. 3 N., R. 3 E.; T. 1 N., R. 1 W., approved November 23, 1915, by the Secretary of the Interior and on file in the office of the project manager, United States Reclamation Service, Phoenix, Ariz., and the local land office at the same place.

2. Homestead entries of the farm units shown on said plats embracing public lands of the United States may be made on and after March 1, 1917, at 9 o'clock a. m. at the local land office, Phoenix, Ariz., if found regular and accompanied by the certificate of the project manager, showing that water-right application has been filed and the proper water-right charges deposited.

3. Warning is hereby expressly given that no person will be permitted to gain or exercise any right whatever under any settlement or occupation begun at or prior to 9 a. m., March 1, 1917, on any lands shown on said plats, provided, however, that this shall not interfere with any valid existing rights obtained by settlement or entry while the land was subject thereto. The project manager will receive water-right applications and issue certificates to applicants for public lands at any time after the date of this notice.

4. The limit of area per entry representing the acreage which in the opinion of the Secretary of the Interior may be reasonably required for the support of a family upon such lands is fixed at the amounts shown upon the plats for the several farm units. The maximum limit of area for which water-right application may be made for lands in private ownership shall be 160 acres of irrigable lands for each land owner. Water-right applications for lands in private ownership may be made on and after the date of this notice. All water-right applications, whether for public or private lands, must be made to the project manager, United States Reclamation Service, Phoenix, Ariz.

5. The water right for all lands covered by such water-right applications shall consist of (*a*) the share proportionate to irrigable acreage therein, of the stored and developed supply actually available from the irrigation works of the Salt River project during the irrigation season, as determined by the project manager or other proper officer of the United States, or of its successor in control of the project; and (*b*) the right to have carried in the distributing system of the project for the said land the water, if any, decreed thereto in the

case of Hurley *v.* Abbott et al., in the district court of the third judicial district of the Territory of Arizona, in and for the county of Maricopa: *Provided, however,* That the whole amount of water actually delivered from all sources shall be limited to the quantity that shall be beneficially used for the irrigation of the land.

6. The water-right charges for said lands shall be of two kinds: (*a*) A charge of $60 per irrigable acre for the building of the irrigation system, termed the "construction charge," the installments being due and payable as herein provided; and (*b*) an annual charge for operation and maintenance, the minimum charge therefor being due and payable in advance on October 1 of each year. The minimum operation and maintenance charge for the irrigation year beginning October 1, 1917, and ending September 30, 1918, shall be due on October 1, 1917, and shall be 75 cents for each acre of irrigable land whether irrigated or not, and for such minimum charge there may be delivered not to exceed 1 acre-foot of water per acre. For each acre-foot of water per acre furnished in addition, a charge of 75 cents per acre-foot shall be made. The charges for the additional water shall be due and payable on October 1 after the end of the irrigation year. The operation and maintenance charges for future years will be duly announced.

7. For all of said lands that were subscribed to the Salt River Valley Water Users' Association and that had otherwise become subject to the terms and conditions of the reclamation law on or before August 13, 1914, for the purpose of securing the delivery of water to them from the Salt River project and for which acceptance or water-right application under the terms of the said reclamation extension act shall be duly filed within six months from the date hereof, the latter being by means of a water-right application of the form provided for under said reclamation extension act, the first installment of the construction charge shall be due on December 1, 1917, and subsequent installments on December 1 of each year thereafter. The first four of such installments shall each be 2 per cent, the next two each 4 per cent, and the next fourteen each 6 per cent of the construction charge.

8. For any holder of lands described in paragraph 7 who elects not to file acceptance or water-right application under the reclamation extension act within the time limited by law, the first installment of the construction charge shall be due December 1, 1917, and the same shall consist of one-tenth of the construction charge, as hereinbefore fixed, and payment shall be made on account of operation and maintenance as provided in paragraph 6 hereof. Additional installments, each one-tenth of the construction charge, shall be due on December 1 of each year thereafter for nine years. Persons coming under the terms of this paragraph shall file water-right application on the form in use prior to the passage of the act of August 13, 1914.

9. For all lands that were not subscribed to the Salt River Valley Water Users' Association and that has not otherwise become subject to the terms and conditions of the reclamation law on or before August 13, 1914, for the purpose of securing the delivery of water to them from the Salt River project, 5 per cent of the construction charge, called the initial payment, shall be paid at the time of making water-right application, which shall be on the form provided therefor referred to in paragraph 7. The remainder of the construction charge shall be paid in 15 annual installments, the first five of

which shall each be 5 per cent of the construction charge and the remaining installments each 7 per cent thereof. The first annual installment will become due December 1 of the fifth calendar year after the year in which the initial payment is due. The subsequent annual installments become due on December 1 of each year thereafter.

10. For all lands under the Highline Canal the water is delivered by pumping and said lands shall be subject to payment, in addition to the usual charges for water served to lands by gravity, of the annual charges for operation and maintenance of the Highline pumping plant and all appurtenances, including the actual cost of power used by said plant without interest on investment, as hereafter announced.

11. In all cases where water-right application for lands in private ownership or for lands under entries not subject to the reclamation act shall not be made within one year after the date of this notice, the construction charge for such land shall be increased 5 per cent each year until such application is made and an initial installment is paid.

12. Any water-right applicant may pay the whole or any part of the construction charge within a shorter period than hereinbefore provided.

13. Until further notice the carriage charge for the delivery of decreed water through the irrigation system of the project for lands for which no water-right application has been made on or before October 1 of any year shall, for the irrigation year beginning on that day, be as follows: (*a*) A charge for the use of the project delivery system of $1 for each acre for which application for delivery of water is made payable at the time of making request for such delivery plus (*b*) a charge of 50 cents per acre-foot for each of the first three acre-feet of water per acre furnished and for any additional water delivered the charge shall be 75 cents per acre-foot. Payment for all such water deliveries shall be made in advance. The conditions of water delivery shall be the same as are applicable for other lands in the project. The charges stated in this paragraph shall not apply to town sites for which contracts for water delivery have been made with the Reclamation Service.

14. All charges must be paid at the office of the United States Reclamation Service in Phoenix, Ariz., unless otherwise ordered. Drafts on New York or money orders, checks, etc., should be made payable to the special fiscal agent, United States Reclamation Service, Phoenix, Ariz.

15. The method of determining the annual operation and maintenance charge and the penalties for failure to pay the construction charge and the operation and maintenance charges when due, and discount allowed for prepayment of operation and maintenance charges are prescribed by the reclamation extension act of August 13, 1914, for lands subject to that act, and for other lands the same method of determining operation and maintenance charges and penalties and discounts thereon will be applied, except that no discount shall apply to payments under paragraph 13.

16. Until further notice flood waters as classified under the rules hereinafter stated will, after September 30, 1917, be delivered at the same rates as are fixed for operation and maintenance charges for the

same irrigation year, except that 1 acre-foot only will be charged for each 2 acre-feet delivered. The term "flood waters," as here used, is defined as any flow in the Rio Verde in excess of the following: During December and January, 800 second-feet; during February, March, and November, 1,200 second-feet; and from April 1 to October 31, both inclusive, 1,600 second-feet.

17. The money derived from the leases of surplus power or power privilege will be covered into the reclamation fund and be placed to the credit of the project. Whenever the proportionate part of the moneys so credited to the project shall equal the unpaid portion of the construction charge on account of any water-right application no further payment on account of such water-right application will be required.

FRANKLIN K. LANE,
Secretary of the Interior.

PUBLIC NOTICE, MAY 19, 1917.

1. Supplementary to the public notice issued for the Salt River project, Arizona, under date of January 18, 1917, notice is hereby given that certain farm unit plats for said project, as hereinafter described, were approved by the Secretary of the Interior on April 9, 1917, and are now on file in the office of the project manager, United States Reclamation Service, Phoenix, Ariz., and the local land office at the same place. Upon these plats are shown certain irrigable areas in addition to those appearing on the corresponding plats approved November 23, 1915. The plats of April 9, 1917, are described as follows:

Gila and Salt River base and meridian.—T. 1 S., R. 1 E.; T. 1 S., R. 2 E.; T. 1 S., R. 3 E.; T. 1 S., R. 4 E.; T. 1 S., R. 5 E.; T. 1 S., R. 6 E.; T. 2 S., R. 5 E.; T. 2 S., R. 6 E.; T. 1 N., R. 1 E.; T 1 N., R. 2 E.; T. 1 N., R. 3 E.; T. 1 N., R. 4 E.; T. 1 N., R. 5 E.; T. 1 N., R. 6 E.; T. 2 N., R. 1 E.; T. 2 N., R. 2 E.; T. 2 N., R. 3 E.; T. 2 N., R. 4 E.; T. 2 N., R. 6 E.; T. 3 N., R. 1 E.; T. 3 N., R. 2 E.; T. 3 N., R. 3 E.; T. 1 N., R. 1 W.; T. 2 N., R. 1 W.

2. The additional irrigable areas shown on said plats approved April 9, 1917, are hereby made subject to all the provisions of said public notice of January 18, 1917, except that the date of public notice applicable to all such added areas shall be the date of this public notice.

BO SWEENEY,
Assistant Secretary of the Interior

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix, p. 475.]

Feature costs of Salt River project, June 30, 1917.

Principal feature.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys		$83,939.83
Storage works, Roosevelt Reservoir:		
Roosevelt Dam	$20,743.32	3,210,748.53
Right of way		168,341.94
Spillways	104,944.21	149,510.34
Sluicing tunnel		74,794.93
New sluicing tunnel (June, 1915)		29,073.53
Sluicing tunnel repairs	17,470.40	37,423.42
Hydraulic gates		249,841.27
Repairs to tunnels and gates		46,215.50
Overflow weir		8,966.55
Outlet tunnel		58,429.18
Roads		3,385.13
New north outlet tunnel	28,930.20	28,930.20
Total storage works	172,088.13	4,065,660.52
Pumping for irrigation:		
Battery A		16,425.49
Battery B		20,603.87
Battery C		16,734.94
Battery D		19,358.12
Battery E		21,848.29
Battery F		16,808.09
Clemans' wells		8,124.41
San Francisco		29,978.98
McQueen		17,245.44
Test wells		178.75
Total pumping for irrigation		167,306.38
Canal system:		
Granite Reef Dam		627,057.66
Joint Head Dam		39,528.93
Arizona Canal		806,301.63
Grand Canal		233,344.07
Appropriators Canal		11,275.57
South Canal		183,081.61
Eastern Canal		132,545.68
Consolidated Canal		188,944.19
East Branch Consolidated Canal		49,763.00
Main Consolidated		35,718.91
Mesa Canal		43,000.00
Tempe Canal		7,813.85
San Francisco Canal		12,891.00
Eureka Canal		9,269.00
Total canal system		2,380,535.10
Lateral system	[1] 89.46	619,349.96
Drainage investigation	2,490.91	7,160.87
Power system:		
Diversion Dam		127,353.22
Power Canal		1,474,063.01
Roosevelt power plant	23,528.82	581,088.68
South Consolidated power plant		163,139.60
Cross Cut power plant		480,454.68
Arizona Falls power plant		109,500.73
Plant No. 5 (engineering)		66.00
Transmission lines		748,034.64
Switching and substations		94,581.75
Protective wall, south spillway	27,326.66	27,326.66
Connection with 7-foot penstock	33,969.46	33,969.46
Excavation of river channel	46,560.33	46,560.33
Storehouse Roosevelt power house	2,851.28	2,851.28
100 horsepower motor generator set	24.00	24.00
Total power system	134,260.55	3,889,014.04
Farm units	2,814.70	30,938.17

[1] Deduct.

Feature costs of Salt River project, June 30, 1917—Continued.

Principal feature.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Permanent improvements:		
Lands not submerged by reservoir		$37,642.90
Roads		620,942.20
Buildings and grounds		105,101.07
Total permanent improvements		763,686.17
Telephone system		69,734.13
Operation and maintenance during construction (rental basis)	$395,746.61	2,324,682.26
Plant accounts	[1] 5,457.41	39,453.31
Unadjusted clearing accounts	[1] 586.27	[1] 586.27
Gross construction cost to June 30, 1917	701,267.76	14,440,874.47
Less revenues earned during construction period:		
Rental of buildings	3,744.00	19,527.88
Rentals of grazing farm lands	209.00	19,316.14
Rentals of irrigation water	350,324.15	1,988,989.73
Contractors freight refund	1,911.22	21,180.85
Forfeitures by defaulting bidders		7,816.30
Other revenues not classified	103,470.53	160,412.11
Profit on messhouse operations	6.33	18,261.09
Profit on mercantile store operation	[1] 94.06	2,515.31
Profit on hospital	1,713.75	1,437.64
Livestock, sheep, and goats	[1] 1,156.49	[1] 1,156.49
Net power revenue	280,384.73	642,437.61
Joint construction of power plant		714,777.37
Total revenues	740,513.16	3,595,515.54
Amount of depreciation charged into costs	72,032.70	392,517.26
	812,545.86	3,988,032.80
Net cost of project to June 30, 1917, construction		10,452,841.67

[1] Deduct.

Statement of cost by calendar years, Salt River project.

Year ending Dec. 31—	Construction.	Operation and maintenance during construction.	Total cost.
1905	$1,980,802.31		$1,980,802.31
1906	1,070,221.39		1,070,221.39
1907	1,393,460.43	$45,302.29	1,438,762.72
1908	1,917,586.34	70,663.13	1,988,249.47
1909	1,854,324.20	101,912.66	1,956,236.86
1910	748,299.49	211,784.16	960,083.65
1911	623,518.41	280,303.42	903,821.83
1912	198,263.08	276,731.94	474,995.02
1913	440,031.70	362,786.59	802,818.29
1914	227,570.36	412,430.62	640,000.98
1915	1,292,171.24	395,433.33	1,687,604.57
1916	152,057.03	591,566.71	743,623.74
Jan. to June 30, 1917	179,019.19	269,046.51	448,065.70
Plant and clearing accounts to June 30, 1917	38,867.04		38,867.04
Less cost of producing power to June 30, 1917		[1] 693,279.10	[1] 693,279.10
Total	12,116,192.21	2,324,682.26	14,440,874.47

[1] Deduct.

Statement of cost by fiscal years, Salt River project.

Year ending June 30—	Construction.	Operation and maintenance during construction.	Total cost.
1906	$2,484,974.27		$2,484,974.27
1907	1,387,755.52		1,387,755.52
1908	1,587,298.68		1,587,298.68
1909	1,981,597.37		1,981,597.37
1910	1,523,242.46		1,523,242.46
1911	913,653.17		913,653.17
1912	668,874.84		668,874.84
	[1] 1,143,593.23	$1,143,593.23	
1913	646,290.55		646,290.55
1914	241,517.49	422,600.01	664,117.50
1915	1,367,272.33	388,279.39	1,755,551.72
1916	106,876.89	514,433.66	621,310.55
1917	305,521.15	395,746.61	701,267.76
Plant and unadjusted clearing accounts to June 30, 1916	44,910.72		44,910.72
Less cost of producing power to June 30, 1916		[2] 539,970.64	[2] 539,970.64
Total	12,116,192.21	2,324,682.26	14,440,874.47

[1] Deduct and transfer to operation and maintenance.
[2] Deduct.

ARIZONA-CALIFORNIA, YUMA PROJECT.

W. W. Schlecht, project manager, Yuma, Ariz.

LOCATION.

Counties: Yuma, Ariz.; Imperial, Cal.

Townships: 3 to 13 S., Rs. 21 to 25 W., Gila and Salt River meridian; 9 to 17 S., Rs. 16 to 23 E., San Bernardino meridian.

Railroads: Southern Pacific; Yuma Valley Railroad.

Railroad stations and estimated population January 1, 1917: Yuma, 4,500; Gadsden, Ariz., 75; Potholes, Cal., 25.

WATER SUPPLY.

Source of water supply: Colorado River.

Area of drainage basin: 229,000 square miles above Laguna Dam.

Annual run-off in acre-feet of Colorado River at Yuma (287,000 square miles), 1902 to 1916: Maximum, 26,000,000; minimum, 7,960,189; mean, 16,927,000.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service is prepared to supply water, season of 1917: 73,000 acres.

Area under water-right applications and rental contracts, season of 1917: 54,000 acres.

Length of irrigating season: 365 days.

Elevation of irrigable area: 100 to 300 feet above sea level.

Rainfall on irrigable area: Five-year average, 2.93 inches; 1916, 2.45 inches.

Range of temperature on irrigable area: 22° to 118° F.

Character of soil of irrigable area: Bottom lands, rich alluvium; mesa lands, Fresno gravelly sand.

Principal products: Semitropical fruits, alfalfa, grain, and Egyption long-staple cotton.

Principal markets: Los Angeles and San Francisco, Cal.; Arizona towns; and eastern markets for early produce.

LANDS OPENED FOR IRRIGATION.

Dates of public notices: January 12, 1910; March 8, 1912; March 6, 1913; June 23, 1913; April 7, 1916; April 6, 1917.

Location of lands opened: T. 15 S., R. 23 E.; T. 16 S., Rs. 22 and 24 E.; San Bernardino meridian; T. 8 S., Rs. 23 and 24 W.; T. 9 S., Rs. 23 and 24 W.; T. 10 S., Rs. 24 and 25 W.; T. 11 S., Rs. 24 and 25 W., Gila and Salt River base and meridian.

Present status of irrigable lands opened: 6,503 acres entered, subject to the reclamation act and the act of April 21, 1904.

Limit of area of farm units: Public, 40 acres.

Duty of water: 3½ acre-feet per acre per annum at the farm.

Building charge per acre of irrigable land: $55, $66, and $75.

Annual operation and maintenance charge: $1.50 per acre minimum charge, which entitles the water user to 2 acre-feet per acre of irrigable land. Water in excess of this amount will be charged at 75 cents per acre-foot.

CHRONOLOGICAL SUMMARY.

Reconnoissance made and preliminary surveys begun in 1902.

Construction recommended by board of engineers April 8, 1904.

Construction authorized by Secretary, May 10, 1904.

Canal system of Colorado Valley Pumping & Irrigating Co. purchased March 15, 1907.

First irrigation by Reclamation Service, season of 1907.

Canal system of Yuma Valley Union Land & Water Co. (Farmers' Gravity Canal) purchased February 3, 1908.

Rollins ditch (including Ives heading pumps and ditches) purchased July 23, 1908.

Laguna Dam completed March, 1909.
Colorado River siphon completed June 29, 1912.
Gravity water from Laguna Dam furnished to Yuma Valley through siphon June 29, 1912.
Yuma Valley Railroad constructed June, 1914.
Entire project 64 per cent completed June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the Yuma project provides for the diversion of water from the Colorado River at the Laguna Dam, 10 miles northeast of Yuma, Ariz., into a canal system heading on the California side, conveying water to the irrigable lands on that side of the river, including those in the Yuma Indian Reservation, crossing the river at Yuma through an inverted siphon and serving lands in the Yuma Valley below the town of Yuma. The plan also provides for large pumping plants below Yuma on the east main canal for raising water to irrigate 40,000 acres of mesa land. The lands adjacent to the Colorado River are protected from overflow by means of levees. The United States claims all waste, seepage, unappropriated spring and percolating water arising within the project, and proposes to use such water in connection therewith. The Laguna Dam, 340 miles of canals and laterals, including 19 miles of drainage ditches, the Colorado River siphon, 930 feet in length and 14 feet in diameter, and about 74 per cent of the levee system are completed.

SUMMARY OF GENERAL DATA FOR YUMA PROJECT TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is complete		110,000
Public land entered to end of fiscal year	6,500	
Public land withdrawn at end of fiscal year	38,500	
State land	5,800	
Indian land	8,500	
Private land	50,700	
Acreage service could have supplied, season of 1916		73,000
Estimated acreage service can supply July 1, 1918		73,000
Acreage actually irrigated, season of 1916		29,483
Acreage cropped under irrigation, season of 1916		28,283
Crops:		
Value of irrigated crops, season of 1916		$1,435,403.00
Value of irrigated crops per acre cropped		50.75
Finances:		
Gross construction cost to end of fiscal year		$9,051,993.86
Per cent complete at end of fiscal year		64
Appropriated for fiscal year 1918, total		$500,000.00
Allotment for construction, fiscal year 1918		373,000.00
Estimated per cent complete June 30, 1918		67
Proposed appropriation, fiscal year 1919, for construction		$445,000.00
Estimated gross construction expenditures to June 30, 1919		9,869,993.86
Estimated per cent complete June 30, 1919		71
Announced construction charges per acre		$55, $66, and $75
Total appropriation, fiscal year 1917		[1] $1,088,678.69
Expenditures during fiscal year chargeable to 1917 appropriation:		
Disbursements	$374,771.71	
Transfers	27,753.54	
	$402,525.25	
Registered liabilities chargeable to 1917 appropriation	62,033.08	
		464,558.33
Unencumbered balance July 1, 1917		624,120.36

[1] Includes balance of 1916 appropriation and refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

Repayments:	
Construction charges—	
Accrued to end of fiscal year	$406,790.51
Collected to end of fiscal year	274,199.84
Uncollected at end of fiscal year	132,590.67
Operation and maintenance charges (public notice)—	
Accrued to end of fiscal year	99,503.33
Collected to end of fiscal year	78,637.10
Uncollected at end of fiscal year	20,866.23
Water rental charges—	
Accrued to end of fiscal year	321,150.89
Collected to end of fiscal year	314,494.91
Uncollected at end of fiscal year	6,655.98
Drainage:	
Estimated acreage damaged by seepage to end of fiscal year	8,000
Miles of drains built to end of fiscal year—	
Open	14.5
Closed	4
Estimated acreage protected by drains built to end of fiscal year	12,000
Estimated acreage to be protected by authorized system	52,000
Cost of drainage works to end of fiscal year	$204,888.03

CONSTRUCTION DURING FISCAL YEAR.

Canal system.—A timber by-pass was built at the siphon spillway, station 538, Yuma main canal, in the Yuma Indian Reservation.

In the Yuma Indian Reservation 2,975 cubic yards of material were moved in building one-half mile of new canal and raising canal banks. A concrete culvert containing 35 cubic yards of concrete and 224 cubic yards of excavation and back fill was built under the Southern Pacific Railroad track to serve a small area of land south of tracks. Seven small wooden structures were built. In the Yuma Valley 11,980 cubic yards of earth were moved in building 1¾ miles of new laterals. Sixty small wooden structures of various kinds were built.

Seepage and drainage.—No construction work has been in progress in the Yuma Indian Reservation. On April 14, 1917, ballots were mailed for a vote on supplemental drainage construction, to be accepted not later than May 10. The result was against the settlers consenting to pay for further work of this nature.

Surveys for main drain and laterals were in progress in Yuma Valley. Elevations on test wells at practically all section corners of the valley were taken, and these denoted a general rise in the ground water. Construction work was started on the main drain the latter part of December, 1916. Up to June 30, 1917, the work had progressed to station 146. The yardage amounted to 113,794 cubic yards. Five highway bridges and four metal flumes were constructed over drainage canals. A temporary pumping plant was built and operated at the lower end of the drain.

River-front protection.—Yuma Indian Reservation: Owing to the continued rise of the water surface of the Colorado River from Sellew Siding to Laguna Dam, it was found necessary to raise the reservation levee between these points an average of about 18 inches. This work was done in March and April, 1917, by dump cars loaded by steam shovel and drag-line excavator at Potholes. During the fiscal year 66,820 cubic yards of rock revetment were placed. The portions of the levee threatened by erosion were 3 and 7 miles from Potholes.

Gila Valley: In February and March, 1917, the upper 4 miles of the Arizona levee were raised an average of 18 inches by means of drag-line excavator, 23,988 cubic yards of earth being moved in this work. In July, 1916, 990 cubic yards of rock were placed at the upper end of the levee. In January, 1917, 1,098 cubic yards of rock revetment were placed at the end of spur dike No. 3.

Yuma Valley: During April, 1917, 7,157 cubic yards of earth were moved in raising a low section of levee at the 23-mile post. During the year 110,000 cubic yards of rock revetment were placed, mainly at the 17 and 23 mile points.

BOARD REPORTS.

Subject.	Date.	Personnel.
Report to Secretary of the Interior and President University of California, by Board of Engineers, on Irrigation and Flood Protection Problems of Imperial Valley, Cal.	Mar. 5, 1917	Elwood Mead, of the University of California; D. C. Henny, consulting engineer; Joseph Jacobs, consulting engineer.
Yuma Mesa development	Mar. 7, 1917	Do.
Yuma Valley drainage	May 15, 1917	D. W. Murphy, drainage engineer; W. W. Schlecht, project manager.

OPERATION AND MAINTENANCE.

The irrigable area of the project comprises some 110,000 acres, divided into separate units, as follows: Yuma Indian Reservation, 15,000 acres, of which 6,500 have been opened to white settlers under public notice of January 12, 1910, the balance being divided among the Indians in 10-acre lots; Yuma Valley, 55,000 acres; and the Yuma Mesa, 40,000 acres. There were constructed on June 30, 1916, 340 miles of main canal and laterals, as follows: Project main canal from Laguna Dam to the Colorado River siphon intake, 13.5 miles; Yuma Valley, 216 miles; Indian reservation, 76 miles, including 16 miles of drainage ditches; North Gila Valley, 18.5 miles. Areas on the Yuma Mesa are not yet receiving water.

Historical review Yuma project.

Item.	1912	1913	1914	1915	1916	[1] 1917
Area for which service was prepared to supply water	16,000	50,000	60,000	71,200	72,140	73,000
Acreage irrigated	13,767	19,607	25,207	27,857	29,483	35,000
Number of farms irrigated	470	616	698	737	790	890
Miles of canals operated	163	228	272	307	316	320
Water diverted (acre-feet)	96,409	127,307	154,670	246,786	249,700	250,000
Water delivered to land (acre-feet)	63,273	85,411	93,167	92,897	94,393	115,000
Acre-feet to acre for area under cultivation	4.60	4.36	3.69	3.34	3.20	3.3

[1] Estimated.

SETTLEMENT.

A large number of new settlers have moved on to the project the past year. A number of these have been attracted by the returns on the cotton crop, which have been unusually high. A great many land transfers were made during the year. About 3,500 acres of State school land were sold. The price of raw land has increased about 25 per cent. A large portion of the Indian lands, Yuma Indian Reservation, has been leased to white people.

Settlement data, Yuma project.

Item.	1913	1914	1915	1916	To June 30, 1917.
Total number of farms on project (when completed)	4,000	4,000	4,000	4,000	4,000
Number of farms reported	616	698	737	790	860
Population	1,663	1,815	2,036	2,002	2,200
Number of towns	3	3	4	5	5
Population	4,075	4,200	4,385	5,345	5,350
Total population of towns and farms	5,738	6,015	6,421	7,347	7,550
Number of public schools	13	14	15	17	17
Number of churches	6	7	7	9	9
Number of banks	3	3	4	4	4
Total capital stock of banks					$180,000
Total deposits of banks					$1,150,000
Total number of depositors					3,700

PRINCIPAL CROPS.

The principal crops raised on the project during the year 1916 were cotton, alfalfa hay, alfalfa seed, milo maize, Kafir corn, feterita, wheat, and barley. On account of the rise in price of alfalfa seed there has been a shortage of alfalfa hay during the year and the indications are that the shortage will extend into 1917. The acreage in cotton has trebled in 1917, and about 45 per cent of the irrigated land on the project is planted to this crop. Prices for all farm products have been very high.

Crop report, Yuma project, Arizona-California, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay	10,880	Ton	28,029	2.58	$9.52	$266,898	$24.53
Alfalfa seed	8,100	Bushel	43,930	5.42	7.48	328,725	40.58
Barley	1,195	do	28,086	23.50	.69	19,433	16.26
Beans	234	do	2,428	10.37	4.20	10,215	43.65
Indian corn	55	do	1,875	34.00	.72	1,345	24.45
Corn sorghum	4,897	do	195,799	39.97	.64	124,915	25.50
Cane and cane fodder	1,832	Ton	5,902	3.22	3.27	19,289	15.29
Cotton	4,670	Pound	2,289,430	490	.174	397,420	85.10
Cotton seed	4,670	do	4,582,610	981	.015	70,277	15.05
Fruit	89					4,440	49.88
Truck	338					25,038	74.08
Hay, except alfalfa	901	Ton	1,075	1.20	9.66	10,383	11.52
Pasture	7,282					82,643	11.35
Wheat	456	Bushel	7,220	15.84	1.39	10,032	22.00
Estimated additional revenue derived from pasturing alfalfa and stalk lands and feeding alfalfa straw after thrashing						64,350	
Less duplicated areas	17,316						
Total cropped acreage	28,283	Total and average				1,435,403	50.75

		Areas.	Acres.	Farms.
Irrigated, no crops: New land and non-bearing orchard	1,200	Total irrigable area farms reported	41,841	790
		Total irrigated area farms reported	29,483	790
		Under water right applications	6,170	272
		Under rental contracts	23,313	518
Total irrigated acreage	29,483	Total cropped area farms reported	28,283	790

PUBLIC NOTICES AND ORDERS.

PUBLIC NOTICE, APRIL 6, 1917.

1. In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and of acts amendatory thereof and supplemental thereto, and particularly the reclamation extension act of August 13, 1914 (38 Stat., 686), public notice for the second unit of the Yuma project, Arizona-California, is hereby issued, as follows:

2. *Lands for which water will be furnished.*—Upon proper water-right application being made therefor, water will be furnished under said project in the irrigation season of 1917 and thereafter, for the irrigable lands of the second unit, shown on the following farm-unit plats (excepting, however, all unentered public land), viz:

Gila and Salt River base and meridian: T. 8 S., R. 23 W.; T. 9 S., R. 23 W.; T. 8 S., R. 24 W.; T. 9 S., R. 24 W.; T. 10 S., R. 24 W.; T. 11 S., R. 24 W.; T. 10 S., R. 25 W.; T. 11 S., R. 25 W.

San Bernardino meridian: T. 16 S., R. 24 E.; T. 16S., R. 22 E.

Approved by the Secretary of the Interior on January 15, 1917, and on file in the office of the project manager, United States Reclamation Service, Yuma, Ariz., and in the local land office at Phoenix, Ariz.

3. *Limit of area for which water right may be secured.*—The limit of area per entry representing the acreage which, in the opinion of the Secretary of the Interior, may be reasonably required for the support of a family upon such lands is fixed at the amounts shown upon the plats for the several farm units. The maximum limit of area for which water-right application may be made for lands in private ownership shall be 160 acres of irrigable land for each landowner.

4. *Application for water rights.*—All water-right applications must be made to the project manager, United States Reclamation Service, Yuma, Ariz., upon forms provided for that purpose and may be made on or after the date of this notice.

5. *Classes of charges for water rights.*—The water-right charges are of two kinds, to wit: (*a*) A charge against each irrigable acre to cover the cost of construction of the irrigation system, called the construction charge; and (*b*) an annual charge against each irrigable acre to cover the cost of operation and maintenance of the system, called the operation and maintenance charge.

6. *Construction charge.*—The construction charge for said unit shall be $75 per acre of irrigable land, payable as follows:

(*a*) For lands that were, prior to August 13, 1914, subjected by contract or otherwise to the provisions of the reclamation law, said construction charge shall be paid in 10 equal annual installments, the first of which shall be paid at the time of filing water-right application and subsequent installments shall be due and payable December 1 of each year thereafter; provided, however, that if water-right application subject to the provisions of said reclamation extension act, or an acceptance of the provisions of said act, be filed within six months from the date of this notice said construction charge shall be payable in 20 installments, the first of which shall become due and payable on December 1 following the date of water-right application and subsequent installments on December 1 of each year thereafter; in which event the first 4 installments shall each be 2 per cent, the next

2 installments each 4 per cent, and the next 14 each 6 per cent of the total construction charge.

(*b*) For the remaining land an initial payment of 5 per cent of the construction charge shall be made at the time of filing water-right application and the remainder of the construction charge shall be paid in 15 annual installments, the first 5 of which shall each be 5 per cent and the remainder each 7 per cent of the total construction charge. The first of said 15 annual installments shall become due and payable December 1 of the fifth calendar year after the initial installment, and subsequent installments shall become due and payable on December 1 of each calendar year thereafter.

7. *Increased construction charge in certain cases.*—In all cases where water-right application for lands in private ownership or for lands under entries not subject to the reclamation law shall not be made within one year from the date of this notice, the construction charge for such land shall be increased 5 per cent each year until such application is made and an initial installment is paid.

8. *Advance payment of construction charge permissible.*—Any water-right applicant or entryman may, if he so elects, pay the whole or any part of the construction charge owing by him within any shorter period than that provided by the public notices and orders applicable to his land.

9. *Operation and maintenance charge.*—For the year 1917, the operation and maintenance charge under this notice shall apply only to the irrigable lands described in section 2 hereof not covered by valid water-rental contract at the date hereof; for the year 1918 and thereafter said charge shall apply to all of the irrigable lands described in section 2 of this notice. The minimum operation and maintenance charge for the year 1917 and thereafter until further notice, shall be $1.50 per irrigable acre, whether water is used thereon or not, which will entitle the applicant to 2 acre-feet of water per irrigable acre. Additional quantities will be furnished for 75 cents per acre-foot. All such charges will be due and payable annually on March 1 following the irrigation season

10. *Place and manner of payment of water charges.*—All water charges must be paid at the office of the Reclamation Service, Yuma, Ariz., in currency or by New York draft or money order payable to special fiscal agent, United States Reclamation Service.

11. *Exclusion of lands by action of Colorado River.*—Every water-right application shall contain the following provisions: The applicant hereby releases the United States from any and all claims for loss or damages on account of (1) the exclusion of said lands or any part thereof from the irrigable lands of said project, or (2) the failure to supply water for the irrigation of any part of the land hereinbefore described when such exclusion or failure is due to (*a*) the destruction by flood, erosion, encroachment, or other action of the Colorado River, of the levees erected by the Reclamation Service along the banks of said river, or (*b*) a change in the location of said levees when such change is considered necessary by the proper officials of the United States to prevent the destruction of said levees from the said causes. Land so excluded shall be relieved from payment of all installments of construction and of operation and maintenance charges which otherwise would thereafter come due from the lands so excluded.

12. *Termination of water-rental contracts.*—All water-rental contracts for lands covered by this public notice, in effect on date of this notice, will remain in force until the end of the irrigation season of 1917, and notice is hereby given that all such contracts will terminate December 31, 1917. Water will be furnished after December 31, 1917, only to lands for which water-right application has been made hereunder.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix, p. 477.]

Feature costs of Yuma project, June 30, 1917.

Principal feature.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys	$1,334.85	$172,544.80
Canal system:		
Preliminary work	[1] 341.64	167,514.46
Diversion dam	[1] 1,985.88	1,749,041.32
Headworks		352,334.25
Main canal		541,871.15
Siphon		694,703.22
Bridges		8,372.17
Drops, chutes, and checks	1,143.29	56,476.50
Minor structures		573.86
	[1] 1,184.23	3,570,886.93
Lateral system:		
Yuma Valley	11,503.31	990,504.79
Reservation, Indian, north of railroad	1,178.64	96,032.60
Reservation, white	[1] 167.77	265,706.57
Reservation, Indian, south of railroad	2,014.53	3,293.62
Gila Valley	[1] 143.87	153,451.52
Mesa	9,510.41	10,155.49
	23,895.25	1,519,144.59
Drainage system:		
Yuma Valley	52,326.24	58,738.58
Reservation	[1] 469.97	146,149.45
	51,856.27	204,888.03
Flood protection:		
Yuma Valley	128,435.62	1,290,701.04
Reservation	66,296.40	805,258.46
Gila Valley	8,750.30	404,937.26
	203,482.32	2,500,896.76
Farm units	693.45	32,514.60
Permanent improvements	23,772.41	173,153.09
Telephone system	1,790.47	12,175.08
Operation and maintenance during construction	92,117.86	664,352.62
Unadjusted clearing account	527.18	200,910.18
Plant accounts	[1] 8,494.80	527.18
Gross construction cost to June 30, 1917	389,791.03	9,051,993.86
Less revenue earned during construction period:		
Rental of buildings	1,690.33	5,914.06
Rental of grazing and farming lands	593.00	593.00
Rental of irrigation water	41,710.39	321,150.89
Contractors' freight refunds	[1] .25	18,505.86
Forfeitures by defaulting bidders and contractors	1,060.00	1,060.00
Other revenues, unclassified	6,027.70	6,033.95
Profit on mess-house operations	[1] 2,323.14	[1] 1,458.48
Profit on mercantile store operations	155.32	66,606.97
Profit on hospital operations	[1] 3,208.46	[1] 1,144.99
Profit on railroad operations	1,987.02	[1] 1,862.71
	47,691.91	415,398.55
Net cost of construction of project to June 30, 1917		8,636,595.31

[1] Deduct.

Cost statement by calendar years, Yuma project.

Year ending Dec 31—	Construction.	Operation and maintenance.			Total cost.
		During construction.	Under public notice.	Total operation and maintenance.	
1907	$1,559,917.35	$8,531.91		$8,531.91	$1,568,449.26
1908	1,151,270.00	31,976.49		31,976.49	1,183,246.49
1909	772,675.05	52,776.24		52,776.24	825,451.29
1910	408,696.34	77,866.11	$17,607.12	95,473.23	504,169.57
1911	913,555.20	81,346.35	42,439.91	123,786.26	1,037,341 46
1912	1,295,435.08	80,584.55	20,225.72	100,810.27	1,396,245.35
1913	307,134.30	54,408.32	16,305.40	70,713.72	377,848.02
1914	460,027.80	59,641.00	29,974.20	89,615.20	549,643.00
1915	695,992.32	78,596.70	32,233.85	110,830.55	806,822.87
1916	387,435.92	88,056.69	59,519.66	147,576.35	535,012.27
Jan. 1 to June 30, 1917	234,064.52	50,568.26	12,969.94	63,538.20	297,602.72
Plant and clearing accounts to June 30, 1917	201,437.36				201,437.36
Total	8,387,641.24	664,352.62	231,275.80	895,628.42	9,283,269.66

Cost statement by fiscal years, Yuma project.

Year ending June 30—	Construction.	Operation and maintenance.			Total cost.
		During construction.	Under public notice.	Total operation and maintenance.	
1908	$2,072,001.51				$2,072,001.51
1909	1,154,114.78				1,154,114.78
1910	491,356.42				491,356.42
1911	596,830.96				596,830.96
1912	1,575,164.44				1,575,164.44
1913	465,201.95				465,201.95
1914	287,424.01	$419,182.61		$419,812.61	706,606.62
1915	804,776.88	70,036.90	$141,480.56	211,517.46	1,016,294.34
1916	433,692.14	83,015.25	54,859.59	137,874.84	571,566.98
1917	297,673.17	92,117.86	34,935.65	127,053.51	424,726.68
Plant and clearing accounts to June 30, 1916	209,404.98				209,404.98
Total	8,387,641.24	664,352.62	231,275.80	895,628.42	9,283,269.66

Estimated cost of contemplated work, Yuma project, during fiscal year 1918.

Features.	Estimated cost during fiscal year 1918.	
	Subfeature.	Principal feature.
Examination and survey:		
Yuma project	$5,000	
Mesa auxiliary project	15,000	
		$20,000
Lateral system, extensions of laterals		13,000
Drainage system—Open drains, Yuma Valley		130,000
Flood protection—Levees and dikes, Colorado River		150,000
Farm units—Preliminary and general work		2,000
Permanent improvements—Improvements on right of way, Yuma drain		1,500
Telephone system, extensions		1,500
Operation and maintenance, water-rental basis:		
Yuma Valley to Dec. 31, 1917	53,000	
North Gila Valley	2,000	
		55,000
Operation and maintenance, public notice:		
Yuma Valley, Jan. 1 to June 30, 1918	35,000	
Bard and Indian units	35,000	
		70,000
Stores and other operations		2,000
Total		445,000

CALIFORNIA, ORLAND PROJECT.

A. N. Burch, project manager, Orland, Cal.

LOCATION.

Counties: Glenn and Tehama; reservoir and storage feed canal in Colusa County.
Townships: 21 to 23 N., Rs. 2 to 4 W., Mount Diablo meridian.
Railroads and other transportation lines: Southern Pacific Railroad and steamers on Sacramento River.
Railroad station and estimated population January 1, 1917: Orland, 1,550; railroad flag stations with freight sidetracks, Greenwood, Wyo, and Malton.

WATER SUPPLY.

Source of water supply, Stony Creek.
Area of drainage basin: Above project diversion dams, 735 square miles; above feed canal diversion dam, 97 square miles; above East Park Dam (Little Stony), 102 square miles.
Annual run-off in acre-feet: Stony Creek, near Fruto (601 square miles), 1907 to 1913—maximum, 940,000; minimum, 135,200; mean, 500,000. Little Stony Creek, at East Park Dam (102 square miles), 1907 to 1916—maximum, 170,800; minimum, 12,600; mean, 68,900.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service is prepared to supply water, season of 1917: 20,213 acres.
Area under water-right applications, season of 1917: 16,840 acres.
Length of irrigation season, 1917: From February 1 to October 30—272 days.
Average elevation of irrigable area: 250 feet above sea level.
Rainfall on irrigable area: 1883 to 1916—average, 17 inches; 1916, 16.27 inches.
Range of temperature on irrigable area: 26° to 114° F.
Character of soil of irrigable area: Sandy and gravelly loam, silt loam.
Principal products: Alfalfa, citrus and other fruits, and vegetables.
Principal markets: San Francisco, Cal.; Portland, Oreg.; eastern markets.

LANDS OPENED FOR IRRIGATION.

Dates of order and public notice: April 26 and May 24, 1916; February 8, February 21, 1917.
Location of lands opened: Tps. 21 and 22 N., R. 2 W.; Tps. 21, 22, and 23 N., R. 3 W.; Tps. 22 and 23 N., R. 4 W., Mount Diablo base and meridian.
Present status of lands opened: All in private ownership.
Limit of area of farm units: 40 acres, except that original subscribers are qualified to make water-right applications for an area not to exceed 160 acres.
Building charge per acre of irrigable land: $44.
Annual operation and maintenance charge: $1.15 per irrigable acre, permitting delivery of 3 acre-feet; 15 cents for next acre-foot, 20 cents for next, and 40 cents per acre-foot thereafter.

CHRONOLOGICAL SUMMARY.

Reconnoissance and preliminary surveys made in 1906.
Construction recommended by board of engineers November 12, 1906.
Construction authorized by Secretary, October 5, 1907.
First irrigation by Reclamation Service, season of 1910.
East Park Dam completed July, 1910.
Construction of East Park Feed Canal and second unit of the project authorized by Secretary July 25, 1913.
East Park Feed Canal completed June 30, 1915.
Entire project 99 per cent completed June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the Orland project provides for the storage of water in a reservoir controlled by East Park Dam on Little Stony Creek, about 40 miles southwest of Orland, Cal., and a feed canal 7 miles long connecting the storage basin with Stony Creek. The diversion works for the feed canal are located about 3½ miles west of Stonyford. For the irrigation of lands in the vicinity of Orland water is diverted from Stony Creek into the canal systems at two points—namely, Miller Buttes, 9½ miles northwest of Orland, for the South Canal system, and at the north side weir, 5 miles northwest of Orland, for the North Side Canal system. The South Canal system is to irrigate 13,000 acres on the south side and the North Canal system 7,000 acres on the north side of Stony Creek. The stored water is conveyed from East Park in the natural creek channel 41 miles to the Miller Buttes diversion and 45 miles to the n rth side weir, where it is taken out in distribution systems comprising 128 miles of canals and laterals. The plan also includes a high-line canal from which power may be developed for pumping. The United States intends, for and in connection with the project, to use the waste, seepage, spring, and percolating water arising within the same, and asserts a right thereto by virtue of its reservation of all unappropriated waters of the project source of supply and of its appropriation of said waters in accordance with the State law heretofore made for the purposes of the project.

Work now under way consists of placing concrete lining in the lateral system and extending surface drainage to take care of storm waters.

The present limits of the Orland project may be considered as a unit of the Sacramento Valley project. It may be extended by constructing additional reservoirs on Stony Creek and its tributaries. The chief additional reservoir sites available are Millsite, on Stony Creek, near Fruto; Briscoe, on Briscoe Creek, near Elk Creek; Stonyford, on Stony Creek, at Stonyford, and Stony Gorge, on Stony Creek, near Elk Creek.

SUMMARY OF GENERAL DATA FOR ORLAND PROJECT TO END OF FISCAL YEAR 1917.

Areas:	
Irrigable acreage when project is complete	[1] 20,533
Private land	[1] 20,533
Acreage service could have supplied season of 1916	[1] 20,533
Estimated acreage service can supply July 1, 1918	[1] 20,533
Acreage actually irrigated season of 1916	9,357
Acreage cropped under irrigation season of 1916	7,011
Crops:	
Value of irrigated crops season of 1916	$342,339.00
Value of irrigated crops per acre cropped	$48.83
Finances:	
Gross construction cost to end of fiscal year 1917	$1,011,345.06
Per cent complete at end of fiscal year 1917	99
Appropriated for fiscal year 1918, total	$43,000.00
Allotment for construction fiscal year 1918	$8,800.00
Estimated per cent complete June 30, 1918	99.9
Proposed appropriation fiscal year 1919 for supplemental construction	$60,000.00
Estimated gross construction expenditures to June 30, 1919, including supplemental construction	$949,000.00
Estimated per cent complete June 30, 1919, exclusive of supplemental construction	100
Announced construction charges per acre	$44.00
Total appropriation fiscal year 1917	[2] $80,238.79

[1] Includes 320 acres vested water rights.

[2] Includes balance of 1916 appropriation and refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

Finances—Continued.			
Expenditures during fiscal year, chargeable to 1917 appropriation—			
Disbursements	$40,520.00		
Transfers	2,856.04		
		$43,376.87	
Registered liabilities chargeable to 1917 appropriation		2,964.65	
			$46,341.52
Unencumbered balance, July 1, 1917			33,897.27
Repayments:			
Construction charges—			
Accrued to end of fiscal year			$14,708.05
Collected to end of fiscal year			$14,708.05
Water rental charges—			
Accrued to end of fiscal year			$119,090.22
Collected to June 30, 1917			118,820.22
Uncollected at end of fiscal year			$270.00

CONSTRUCTION DURING FISCAL YEAR.

East Park Dam.—To relieve the necessity of operating the original valves, located at elevation 120, an auxiliary 36 by 36 inch outlet valve was placed at elevation 152 in the gate tower of the dam; the work was done in October and November, 1916.

South Canal.—Construction of the diversion dam across Stony Creek at the intake of the South Canal, which was suspended in January, 1915, on account of high water, was completed during the first half of the fiscal year.

Lateral system.—Work on the lateral system consisted of placing concrete lining, building a number of minor concrete structures, and excavating surface drains.

The following construction work was accomplished during the year 1917:

Excavation	cubic yards	1,025
Concrete	do	1,543
Riprap	do	1,785
Concrete lining (1½ inches thick)	square yards	36,533
Paving	do	112
Gates and gate hoists	pounds	3,017
Minor structures	number	47

SEEPAGE AND DRAINAGE.

Drainage conditions on the project are favorable. In general the soil is porous, is entirely free from deleterious salts, and has good surface and subsurface drainage. There are no seeped areas and no serious rising of ground water has occurred. The project is well supplied with natural drainage channels, and with proper care of these by the landowners when they prepare their land for irrigation practically all danger from waterlogging will be eliminated.

The drainage plans for the project provide for coordinating the work with the farmers as agricultural development advances, the problem consisting primarily of taking care of storm water during the winter season by building open drains where needed to connect with natural channels. Incidentally this will provide for any needed drainage during the irrigation season. As most of the

project requires little of this work, other than that which should be done by the farmers as a regular part of their plans in preparing their lands for irrigation, the situation can be best and most economically handled in cooperation with the landowners as development proceeds. This work was commenced in 1916 and will be continued as occasion arises, utilizing a small amount of funds provided for this purpose in fixing the building cost of the project.

OPERATION AND MAINTENANCE.

The irrigation works operated in 1916 included the East Park Reservoir, storage feed canal, north and south canal headworks, 128 miles of canals and laterals, 45 miles of natural channels, and 1,800 structures of various types. No unusual floods occurred during the rainy season, and no extraordinary repairs to the distribution system were required on account of damage from storm water, as has been the case in a number of previous years. During the irrigation season nothing occurred to interrupt the continuous delivery of water.

Historical review, Orland project.

Item.	1913	1914	1915	1916	1917 [1]
Acreage for which service was prepared to supply water	14,300	14,300	20,193	[2] 20,533	[2] 20,533
Acreage irrigated	6,617	7,354	8,928	9,357	12,000
Miles of canals operated	91	93	115	128	130
Water stored (acre-feet)	14,800	45,600	48,000	48,000	51,000
Water diverted (acre-feet)	40,500	50,000	52,000	60,000	70,000
Water delivered to land ((acre-feet)	19,850	30,000	30,300	38,100	46,000
Per acre of land irrigated (acre-feet)	3.00	4.08	3.40	4.07	4.00

[1] Estimated. [2] Includes 320 acres of vested water rights.

SETTLEMENT AND DEVELOPMENT.

There was very little new development prior to January, but during the last half of the fiscal year a great many new settlers came into the project and began improving their holdings. At the close of the fiscal year all of the project except about 4,000 acres was under process of development, and scores of new buildings dotted those sections which were barren at the beginning of the year. This influx of new settlers, which was greater than for any other equal period in the history of the project, was due to land offerings on easy terms and long-time payments. During the fiscal year 610 water-right applications were made, covering 16,714 irrigable acres.

Settlement data, Orland project.

Item.	1914	1915	1916	1917
Total number of farms on the project	507	509	509	699
Population	1,100	1,600	1,700	1,900
Number of irrigated farms	296	351	384	445
Operated by owners	263	320	342	400
Operated by tenants	33	31	42	45
Population	1,033	1,258	1,260	1,460
Number of towns	1	1	1	1
Population	1,350	1,500	1,550	1,550
Total population	2,450	3,100	3,250	3,450
Number of public schools	8	8	8	8
Number of churches	5	6	7	7
Number of banks	2	2	2	2
Total capital stock	$110,000	$141,000	$141,000	$141,000
Total amount of deposits	$391,000	$395,000	$445,000	$755,000
Total number of depositors	1,263	1,708	1,800	2,420

PRINCIPAL CROPS.

The crop census indicates that as far as farm returns are concerned, 1916 was the most prosperous year in the history of the project.

There were 384 farms irrigated with an average irrigable area of 28.5 acres and an average cropped area of 18.3 acres. The total area irrigated was 9,357 acres, an increase of 429 acres over the previous year.

There was little increase in the acreage planted to alfalfa, but two and a half times more acres were devoted to sorghum corn than in 1915. The average yield of alfalfa was 5.4 tons per acre, and the total for the project was 29,000 tons—an increase of 7,000 tons over the previous year. The value of the crop based on the market price for loose hay was estimated at $219,900, exceeding that of the previous season by $66,600.

The corn yield was 25,300 bushels, an increase of about 15,000 bushels over 1915. The greater part of the hay and corn was fed to dairy and other stock on the project. The returns from almonds and oranges were about double those of the previous year.

Dairying continued to lead all other industries of the project, and the estimated output of the creameries for the year 1916 was over 1,000,000 pounds of butter.

The inventory of stock and equipment shows a present value of $473,000, an increase of $43,200 over the previous year.

Crop report, Orland project, California, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay	5,344	Tons	29,058	5.4	$7.57	$219,906	$41.15
Other hay	179	...do	214	1.2	12.04	2,576	14.40
Pasture	3,185					26,628	8.36
Corn sorghum	848	Bushels	25,370	30	1.00	25,363	29.91
Fruit, citrus	121	Pounds	408,160	3,373	0.025	10,204	84.33
Fruit, deciduous [1]	76	...do	240,000	3,158	0.015	3,600	47.37
Fruit, small	11	...do				650	59.09
Prunes, dried	40	...do	80,000	2,000	0.05	4,000	100.00
Almonds	160	...do	98,933	618	0.165	16,324	102.02
Garden	224					22,288	99.50
Nursery	27					10,800	400.00
Less duplicated areas	3,204						
Total cropped acreage.	7,011	Total and average				342,339	48.83

		Areas.	Acres.	Farms.	Per cent of project. [1]
Irrigated, no crop:		Total irrigable area farms reported	10,954	384	54.2
Nonbearing orchards	1,343	Total irrigated area farms reported	9,357	384	46.3
Young alfalfa	618	Under rental contracts	9,197	382	45.5
Miscellaneous	385	Vested rights	160	2	.8
Total irrigated acreage	9,357	Total cropped area farms reported	7,011	384	34.7

[1] Small mixed orchards of apricots, peaches, apples, etc.

PUBLIC NOTICES AND ORDERS.

PUBLIC NOTICE, FEBRUARY 8, 1917.

1. The farm-unit plat for township 22 north, range 3 west, M. D. M., California, approved by the Assistant Secretary of the Interior on May 24, 1916, and covered by public notice of the same date for the Orland project, California, by inadvertence failed to include in its schedule of irrigable areas for private lands certain acreage in the NW. ¼ SW. ¼ and SW. ¼ SW. ¼ of section 34. Therefore, in pursuance of the provisions of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388) and of acts amendatory thereof and supplementary thereto, and particularly the reclamation extension act of August 13, 1914 (38 Stat., 686), notice is hereby given that water has been made available from the Orland project, California, for the irrigation season of 1916 and thereafter, upon the filing of proper water-right application for the irrigable land in those portions of the NW. ¼ SW. ¼ and SW. ¼ SW. ¼ of section 34, township 22 north, range 3 west, Mount Diablo base and meridian, which are situate on the westerly side of the Southern Pacific Railway tracks and right of way, as shown upon the revised farm-unit plat for said last-named township, approved by the First Assistant Secretary of the Interior on February 2, 1917, and on file in the office of the project manager, United States Reclamation Service, Orland, Cal., and the local land office at Sacramento, Cal.

2. The lands affected by this notice and the water-right charges thereon shall be governed by and be subject to the terms and conditions of the public notice for the Orland project dated May 24, 1916, as the same may be applicable.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

PUBLIC NOTICE, FEBRUARY 21, 1917.

1. *Annual operation and maintenance charges.*—In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and of acts amendatory thereof and supplementary thereto, and particularly of the reclamation extension act of August 13, 1914 (38 Stat., 686), announcement is made that the annual operation and maintenance charge for the irrigation season of 1917, and thereafter until further notice, against all lands of the Orland project, California, under public notice, shall be a minimum charge of $1.15 per irrigable acre whether water is used thereon or not, which charge will permit the delivery of not to exceed three acre-feet of water per acre; and that additional water will be furnished at the rate per irrigable acre of 15 cents for the first additional acre-foot, 20 cents for the second additional acre-foot, and 40 cents per acre-foot for all further quantities. All operation and maintenance charges will be due and payable on March 1 of each year for the preceding irrigation season.

2. *Method of billing and payment.*—The minimum charge aforesaid will be billed to and payment thereof to the United States made through the Orland Unit Water Users' Association. The charges in excess of the minimum rate will be billed direct to the water users and payment thereof made by them to the special fiscal agent, United States Reclamation Service, at the project office.

ALEXANDER T VOGELSANG,
First Assistant Secretary of the Interior.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix, p. 479.]

Feature costs of Orland project to June 30, 1917.

Principal feature.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys	[1] $270.07	
Experimental investigations		$3,213.47
Investigation unused sites		456.49
General expense		465.94
	[1] 270.07	4,135.90
Storage system	1,095.87	
East Park Reservoir surveys		4,060.84
East Park Dam, spillway and dikes		155,727.40
East Park Reservoir, land and clearing		88,469.02
East Park spillway		29,470.79
East Park feed canal		91,186.23
East Park feed canal, diversion dam		24,367.01
East Park feed canal, headworks		6,704.16
East Park feed canal, Salt Creek siphon		4,747.74
East Park feed canal, terminal chute		5,619.22
East Park feed canal, Salt Creek chute		3,463.45
East Park feed canal, county road bridges		2,350.01
East Park feed canal, minor structures		3,137.47
East Park feed canal, culverts		4,642.93
East Park raising spillway		11,431.83
East Park feed canal, concrete lining		18,601.88
East Park Dam, additional gates		1,338.08
	1,095.87	455,318.06
Canal system	4,052.60	
North Canal		24,600.96
South Canal		66,869.93
South diversion dam		26,075.05
South diversion conduit		1,707.88
South diversion headgates		4,242.55
South diversion sluiceway		5,049.76
North diversion dam		3,908.54
North diversion headworks		1,237.04
South High Line Canal		21,172.61
Flume High Line Canal		7,074.97
Chute, High Line Canal		2,178.28
Concrete lining, High Line Canal		1,899.98
Railroad crossing, South Canal		673.45
Excavating plant		4,916.21
	4,052.60	171,607.21
Lateral system	14,937.71	
Laterals and sublaterals		87,439.96
Minor structures		65,555.68
Concrete lining		85,821.09
24-inch pipe line		2,648.51
Railroad crossings		6,251.43
	14,937.71	247,716.67
Drainage system	1,868.80	
Open drains		2,017.93
Minor structures		655.46
	1,868.80	2,673.39
Flood protection: Levees and dikes		499.72
Farm units		1,360.59
Permanent improvements:		
Buildings and permanent improvements		14,497.96
Power line		271.72
		14,769.68
Operation and maintenance during construction	13,127.43	112,281.66
Plant accounts	[1] 5.76	982.18
Gross construction cost to June 30, 1917	34,806.58	1,011,345.06

[1] Deduct.

Feature costs of Orland project to June 30, 1917—Continued.

Principal feature.	Cost.	
	Fiscal year 1917.	Total to June30,1917.
Less revenues earned during construction period:		
Rental of buildings	$70.00	$1,054.00
Rental of grazing and farming lands	351.00	3,568.00
Rentals of irrigation water	23,271.62	119,090.22
Contractors' freight refunds	.....	1,829.82
Forfeitures by defaulting bidders and contractors	.....	2,115.00
Other revenues, unclassified	165.96	1,953.47
Profit on mess-house operations	.....	14.97
Profit on hospital operations	[1] 128.35	574.98
	23,730.23	130,200.46
Net cost of construction of project to June 30, 1917	.....	881,144.60

[1] Deduct.

Statement of cost by calendar years, Orland project.

Year ending Dec. 31—	Construction.	Operation and maintenance.			Total cost.
		During construction.	Under public notice.	Total operation and maintenance.	
1906	$7,213.19	.....	.....	.....	$7,213.19
1907	48,106.71	.....	.....	.....	48,106.71
1908	117,351.53	.....	.....	.....	117,351.53
1909	113,988.22	.....	.....	.....	113,988.22
1910	173,159.82	$1,456.88	.....	$1,456.88	174,616.70
1911	74,414.97	11,412.34	.....	11,412.34	85,827.31
1912	16,488.92	18,342.71	.....	18,342.71	34,831.63
1913	29,564.35	17,229.28	.....	17,229.28	46,793.63
1914	177,089.08	19,814.16	.....	19,814.16	196,903.24
1915	95,491.76	19,292.40	.....	19,292.40	114,784.16
1916	34,034.80	24,444.74	.....	24,444.74	58,479.54
January to June 30, 1917	11,177.87	289.15	$12,046.62	12,335.77	23,513.64
Plant accounts to June 30, 1917	982.18	.....	.....	.....	982.18
Total	899,063.40	112,281.66	12,046.62	124,328.28	1,023,391.68

Statement of cost by fiscal years, Orland project.

Year ending June 30—	Construction.	Operation and maintenance.			Total cost.
		During construction.	Under public notice.	Total operation and maintenance.	
1906	$276.73	.....	.....	.....	$276.73
1907	10,019.66	.....	.....	.....	10,019.66
1908	126,711.08	.....	.....	.....	126,711.08
1909	59,402.42	.....	.....	.....	59,402.42
1910	199,568.73	$1,356.18	.....	$1,356.18	200,924.91
1911	103,524.38	4,141.36	.....	4,141.36	107,665.74
1912	45,533.68	17,019.73	.....	17,019.73	62,553.41
1913	11,780.79	20,872.72	.....	20,872.72	32,653.51
1914	61,160.78	15,266.26	.....	15,266.26	76,427.04
1915	203,470.40	20,240.24	.....	20,240.24	223,710.64
1916	54,947.66	20,257.74	.....	20,257.74	75,205.40
1917	21,679.15	13,127.43	$12,046.62	25,174.05	46,853.20
Plant accounts to June 30, 1916	987.94	.....	.....	.....	987.94
Total	899,063.40	112,281.66	12,046.62	124,328.28	1,023,391.68

Estimated cost of contemplated work, Orland project, during fiscal year 1918.

Features.	Estimated expenditures during fiscal year 1918.	
	Sub-feature	Principal feature.
Lateral system:		
Excavation	$300.00	
15 minor structures	450.00	
20,125 square yards concrete lining	8,050.00	
		$8,800.00
Operation and maintenance under public notice:		
Development	6,000.00	
Distribution	16,400.00	
Miscellaneous	9,400.00	
		31,800.00
Stores and other operations		450.00
Plant and equipment		1,950.00
Total		43,000.00

COLORADO, GRAND VALLEY PROJECT.

S. O HARPER, project manager, Grand Junction, Colo.

LOCATION.

County: Mesa.

Townships: 1 N., Rs. 1 E. and 1 to 3 W.; 2 N., Rs. 2 and 3 W.; 1 S., Rs. 1 E. and 1 W., Ute meridian. 9 S., Rs. 101 to 104 W.; 10 S., Rs. 98, 101, and 103 W.; 11 S., Rs. 98 and 99 W., sixth principal meridian.

Railroads: Denver & Rio Grande; Colorado Midland.

Railroad stations and estimated population, January 1, 1917: Palisade, 700; Clifton, 100; Grand Junction, 8,250; Fruita, 700; Loma, 70; Mack, 40.

WATER SUPPLY.

Source of water supply: Grand River.

Area of drainage basin: 8,550 square miles above Palisade.

Annual run-off in acre-feet of Grand River, at Palisade, 1897 to 1899 and 1902 to 1916: Maximum, 5,230,000 (1912); minimum, 2,300,000; mean, 3,806,200.

Discharge in second-feet of Grand River, at Palisade, 1902 to 1916: Maximum, 50,000; minimum, 1,102.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the Service is prepared to supply water, season of 1917: 35,000 acres.

Area under rental contracts season 1917 (to June 30): 7,653 acres.

Length of irrigation season: From April 1 to October 31, 214 days.

Average elevation of irrigable area: 4,700 feet above sea level.

Rainfall on irrigable area: For 24 years, average, 8.36 inches; 1916, 9.74 inches.

Range of temperature on irrigable area: −15° to 100° F.

Character of soil of irrigable area: Sandy loam, sandy mesas, and adobe.

Principal products: Fruit, sugar beets, alfalfa, grain, vegetables.

Principal markets: Large cities east of Rocky Mountains for fruit; other products, local.

LANDS OPENED FOR IRRIGATION.

No lands have been opened for irrigation by public notice. All lands irrigated in the project are supplied with water under rental contracts. Order: January 25, 1917.

CHRONOLOGICAL SUMMARY.

Reconnoissance and preliminary surveys begun in September, 1902.

Construction recommended by board of engineers December 15, 1908.

Purchase of rights of way authorized by Secretary November 4, 1911.

Construction authorized by Secretary September 23, 1912.

First irrigation by Reclamation Service, season of 1915.

Entire project 66.8 per cent completed June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the Grand Valley project provides for the diversion of water from the Grand River by means of a diversion dam located about 8 miles northeast of Palisade, Colo., into a canal system on the north side of the river for the irrigation of lands lying north and west of Grand Junction, Fruita, and Mack, Colo. About 42,750 acres will be supplied by gravity and 10,250 acres by electrically operated pumping plants to be located on the gravity canal. Power for pumping will be developed in a power plant to be located at the upper portal of Tunnel No. 3. On the first 6 miles of the main canal located in the canyon of the Grand River there are three tunnels, respectively, 3,723, 1,655, and 7,292 feet long. The United States claims all waste, seepage, spring, and percolating water arising within the project, and proposes to use such water in connection therewith.

On June 30, 1917, the diversion dam and headworks were practically complete. The earthwork and tunnels on the main canal from the headworks to West Salt Creek, a distance of 55 miles, were completed and all structures were installed except the steel bridge across East Salt Creek. This portion of the canal system has been primed and seasoned and is now carrying water for irrigation. Lateral facilities have been completed to serve 35,000 acres of the gravity area of the project and a large number of the laterals are now being operated. The protection of the channel of the Little Salt Wash, which will be used as a wasteway from the project main canal, has been completed as far as necessary at this time.

There remain to be completed the last 7 miles of the main canal, laterals to serve 7,750 acres of gravity lands, the power plant and pumping system, and such drainage and further flood protection as may be required.

SUMMARY OF GENERAL DATA FOR GRAND VALLEY PROJECT, TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is complete		53,000
Public land entered to end of fiscal year	9,880	
Public land withdrawn at end of fiscal year	20,190	
Private land	22,930	
Acreage service could have supplied season of 1916		15,000
Addition in fiscal year 1917		20,000
Estimated acreage service can supply July 1, 1918		35,000
Acreage actually irrigated, season of 1916		1,741.5
Acreage cropped under irrigation, season of 1916		1,561.4
Crops:		
Value of irrigated crops, season of 1916		$54,692.05
Value of irrigated crops per acre cropped		$35.03
Finances:		
Gross construction cost to end of fiscal year		$3,083,093.12
Per cent complete at end of fiscal year		66.8
Appropriated for fiscal year 1918, total		$192,000.00
Allotment for construction, fiscal year 1918		$138,000.00
Estimated per cent complete, June 30, 1918		70
Proposed appropriation, fiscal year 1919, for construction		$275,000.00
Estimated gross construction expenditures to June 30, 1919		$3,496,093.12
Estimated per cent complete, June 30, 1919		76
Total appropriation, fiscal year 1917		[1] 648,709.35
Expenditures during fiscal year, chargeable to 1917 appropriation:		
Disbursements	$212,273.39	
Transfers	19,372.72	
	$231,646.11	
Registered liabilities chargeable to 1917 appropriation	18,453.46	
Contract obligations wholly covered by 1917 appropriation	30,166.11	
Estimated engineering expenses on contract work wholly covered by 1917 appropriation	83.58	
		280,349.26
Unencumbered balance, July 1, 1917		368,360.09
Repayments:		
Water rental charges—		
Accrued to end of fiscal year		4,960.65
Collected to end of fiscal year		4,960.65
Drainage:		
Estimated acreage damaged by seepage to end of fiscal year		250
Miles of drain built to end of fiscal year, open		0.7
Estimated acreage protected by drains built to end of fiscal year		50
Cost of drainage works to end of fiscal year		[2] $6,587.36

[1] Includes balance of 1916 appropriation and refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

[2] Includes preliminary and general work.

CONSTRUCTION DURING FISCAL YEAR.

Grand River Dam.—The chains and chain shafts for the rolling crests, for which contract had been entered into during the previous year, were finally delivered in October, 1916, after several months delay. The installation of this machinery was carried on as fast as delivery was made and was entirely finished by January 1, 1917. The work of dismantling and storing the construction plant was continued with a small force and at the end of the year most of the material had been moved to sheds adjacent to the railroad tracks, ready for shipment. A complete physical inventory was in progress on June 30.

The Grand River reached the highest flood on record on June 20, 1917, with a discharge of 50,000 second-feet, but no damage resulted to the dam and the diversion of irrigation water was not interrupted. A small amount of riprap was placed at the end of the downstream wing walls below the abutments to protect the river banks at these points.

Main canal.—Contract for the materials and installation of the 60-inch wood-stave siphon pipe which carries the main canal across East Salt Creek Valley was entered into with the Pacific Tank & Pipe Co. of San Francisco on June 22, 1916. The difficulty of obtaining transportation facilities and an efficient erection gang made progress so slow that the pipe was not completed and tested until January 13, 1917, when it was accepted. During August, 1916, several cloudbursts on the watershed of East Salt Creek caused floods which indicated the advisability of replacing the pile trestle supporting the pipe with a bridge. Plans and specifications were accordingly prepared and advertisement issued for a 96-foot span steel truss. Contract was awarded to the Midland Bridge Co. of Kansas City. Delivery of the material had not been made at the end of the year.

The Mack Wash Wasteway at station 2315 of the main canal was completed by Government forces. This structure consists of an automatic siphon spillway in combination with sluice gates which may be used to empty the canal. Government forces also constructed a concrete culvert under the Uintah Railroad, concrete piers for the East Salt Creek Bridge, and a number of minor structures.

At the end of the fiscal year the construction of the first 55 miles of the main canal was completed, with the exception of the erection of the East Salt Creek steel bridge, and this portion of the canal was in regular operation for the delivery of water.

Lateral system.—On September 14 bids were opened and contracts entered into with five contractors for the excavation of the remaining laterals in the third lateral district. All but one of these contracts were completed at the end of the fiscal year. The installation of the necessary minor structures has been continued throughout the year by Government forces. A total of 308 drops, 79 turnouts, and 149 miscellaneous structures have been placed.

On June 30, 1917, that portion of the lateral system required to supply 35,000 acres of gravity lands was practically completed except for the installation of turnouts and measuring devices. Location surveys for the laterals to serve the remainder of the gravity

unit of the project have been made, but it is not planned to construct facilities to supply the lands lying under the proposed Loma siphon and west of West Salt Creek until the settlement of the project is further advanced.

Surveys.—Field work on the location of laterals, pipe lines, and pumping plants to serve the pumping unit of the project was commenced in the spring of 1917 and was in progress at the end of the fiscal year. An investigation of the Orchard Mesa irrigation district was made at the request of the holders of the district's bonds, who supplied the funds for this work. Negotiations have been undertaken by the landowners and the bondholders looking toward the inclusion of the district in the Grand Valley project but no definite action has been taken.

SEEPAGE AND DRAINAGE.

Practically all seepage on the project has been due to leakage through the shale cuts on the main canal and not to any general rise of the water table. With the seasoning of the canal and the silting of the crevices in the shale, seepage conditions both on the lands in the Mesa County district and on the project lands continued to improve during the season of 1916 and the spring of 1917. A survey of the seeped areas east of the Big Salt Wash, made in June, 1917, showed an area of only 150 acres affected as compared with 275 acres in June, 1916. However, an additional 100 acres have become wet in the area tributary to the lower portion of the main canal in which water was carried for the first time during 1917. It is expected that this area will be materially reduced after this portion of the canal is more thoroughly seasoned.

During September, 1916, an experimental silting plant was installed near the upper portal of tunnel No. 3, for the purpose of sluicing clay into the canal to reduce seepage losses. The results were so satisfactory that it was decided to erect a similar plant near the lower end of division No. 3. On June 30 this installation was nearly completed but operation had not been started. It is planned to continue the operation of this plant at suitable locations along the main canal as long as beneficial results are secured.

Investigations in the Grand Valley drainage district.—The preparation of plans and estimates for a drainage system for the Grand Valley drainage district under contract dated December 13, 1915, was completed and final report furnished the district in December, 1916. Obstacles were encountered which prevented the immediate construction of the complete drainage system for the district, and further investigations were undertaken to determine what portions of the drainage system as planned for the district could be used jointly by the project to conduct waste and drainage water through the lands of the district to the river. These investigations showed that approximately 80 miles of drains and natural drainage channels could be so used, and negotiations are now in progress, looking toward the execution of a contract by the United States and the drainage district for the cooperative construction of such work as can be used by both projects.

BOARD MEETINGS.

Date.	Topic.	Personnel.
Dec. 22, 1916	Drainage (Grand Valley drainage district)	D. C. Henny, A. J. Wiley, D. W. Murphy.
May 15, 1917	Orchard Mesa irrigation district	D. C. Henny, J. H. Miner.
May 16, 1917	Drainage (Grand Valley drainage district)	O. C. Smith. D. C. Henny, J. H. Miner, S. O. Harper. A. W. Walker.

OPERATION AND MAINTENANCE.

The diversion of water into the main canal at the beginning of the season of 1916 was delayed until May 2 by the failure of the contractor to deliver a portion of the hoisting machinery for the sluiceway roller at the Grand River Dam. Emergency equipment was purchased for operating this roller, and water for irrigation was furnished in time to prevent any material loss to crops. Water service was furnished throughout the season to all lands in the first lateral district desiring water on the "supply on demand" basis. A total of 4,224 acre-feet of water was delivered to farms, for the irrigation of 1,741 acres of land. All water was supplied on a rental basis at the rate of 40 cents per acre-foot.

No difficulties of note were encountered in operating the main canal and laterals, in spite of the fact that in August, 1916, heavier rains fell in the valley than had been experienced for many years, causing floods which washed out railroad tracks and bridges adjacent to the project. One small break in the main canal was repaired with little delay. In June, 1917, the Grand River reached the highest stage on record, with a discharge of 50,000 second-feet. Although considerable damage resulted to various irrigation systems along the river, the Grand River Dam and other irrigation works of the project withstood the high water without injury.

The operation and maintenance force was employed during the irrigation season in patrolling the canals, regulating the delivery of water, performing minor repair work, and installing turnouts and measuring devices. During the nonirrigation season the same force was engaged in cleaning canals and laterals, burning weeds, installing new structures, and performing miscellaneous repair work.

Historical review, Grand Valley project.

Item.	1916	1917
Acreage for which service was prepared to supply water	15,000	35,000
Acreage irrigated	1,741.5	[1] 5,000
Miles of canal operated	80	.....
Water diverted (acre-feet)	30,813	.....
Water delivered to land (acre-feet)	4,224	.....
Per acre of land irrigated (acre-feet)	2.42	.....

[1] Estimated.

SETTLEMENT.

No public land on this project has been opened to entry. The Secretary's order of January 25, 1917, makes it possible for the holders of valid entries to dispose of their surplus holdings by relinquishment as soon as resurvey plats are filed in the local land office.

The water users' association has taken active steps to secure the settlement of the private lands on the project through a colonization agency in Kansas City. During the last half of the fiscal year 1,200 acres of land were sold to 20 families. In addition to these sales a large number of transfers of project lands have been recorded, most of the buyers being residents of the valley.

The lands at present are being held at reasonable prices, and prospects are encouraging for extensive settlement and development of the project in the near future.

Settlement data, Grand Valley project.

	1916	1917 [1]
Total number of farms on project	900	900
Population	200	400
Number of irrigated farms	76	150
Operated by owners or managers	50	.....
Operated by tenants	26	.....
Population	168	400
Number of towns	[2] 6	[2] 6
Population	10,800	10,800
Total population in towns and on farms	11,000	11,200
Number of public schools	[2] 24	[2] 24
Number of churches	[2] 28	[2] 28
Number of banks	[2] 7	.....
Total capital stock	$387,000	.....
Total amount of deposits	$2,484,761	.....
Total number of depositors	7,260	.....

[1] Data for 1917 estimated.
[2] These items on lands adjacent to project.

CROPS.

Considering the delay in supplying water for irrigation, the lack of proper leveling of the land by many of the farmers, and the fact that this was the first year that most of the lands were irrigated the crop yield for the season of 1916 was very satisfactory. Market conditions and prices were good, and that fact, together with the assurance that the lands under the project, if properly prepared for irrigation, will produce fair returns the first year, has been conducive to the cultivation of a greatly increased acreage in 1917. The principal crops grown in 1916 were wheat, fruit, oats, beets, alfalfa, and corn, in the order named. Potatoes yielded the highest return per acre.

The crop outlook for 1917 is good. The spring was unusually cold and late, but no injurious frosts occurred, and all crops are in good condition. Prospects are especially good for a bumper fruit crop. The first cutting of alfalfa produced a good yield of excellent quality. It is estimated that 5,000 acres of land are now under cultivation, and a large additional acreage will probably be planted to wheat this fall.

Crop report, Grand Valley project, Colorado, year of 1916.

Crop.	Area (acres)	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay	105.5	Ton	323	3.1	12.16	$3,928.50	$37.24
Alfalfa seed	8	Bushel	16	2	7.00	112.00	14.00
Apples	366.3	Pound	1,124,229	3,069	.014	15,919.14	43.46
Barley	48	Bushel	497	10.4	1.01	502.00	10.46
Beans	14.6	do	121	8.3	5.47	662.27	45.36
Beets, sugar	113.5	Ton	956	8.4	6.07	5,800.00	51.10
Corn, Indian	101.1	Bushel	2,231	22.1	1.07	2,386.16	23.59
Corn, fodder	80	Ton	160	2	5.33	853.10	10.66
Fruits, small	5.4	Pound	2,205	408.3	.047	104.06	19.27
Garden	9.8					575.00	58.67
Oats	243.5	Bushel	6,150	25.3	.58	3,597.29	14.77
Pasture	30					168.00	5.60
Peaches	37.6	Pound	55,758	1,482	.03	1,669.73	44.38
Pears	99.5	do	216,313	2,174	.026	5,589.81	56.18
Peas	1.2	Bushel	7	5.6	2.93	20.50	16.40
Potatoes, white	21.4	do	2,367	110.6	1.30	3,088.62	144.33
Wheat	390.2	do	6,259	16	1.34	8,404.62	21.54
Tomatoes	12.1	Ton	91	7.5	8.98	817.25	67.54
Miscellaneous	18					494.00	27.44
Less duplicated areas	144.3						
Total cropped acreage	1,561.4	Total and average				54,692.05	35.03

		Areas.	Acres.	Farms.	[1] Per cent of project.
Irrigated, not cropped:					
Nonbearing orchard	65.8	Total irrigable area farms reported	2,605.2	76	4.9
Young alfalfa	121.5	Total irrigated area farms reported	1,741.5	76	3.3
Ground fall plowed	344.2	Under rental contracts	1,741.5	76	3.3
Less duplicated areas	351.4	Total cropped area farms reported	1,561.4	70	2.9
Total other purposes	180.1				
Total irrigated acreage	1,741.5				

[1] 53,000 acres (estimated).

PUBLIC NOTICES AND ORDERS.

ORDER, JANUARY 25, 1917.

1. Whereas section 11 of the reclamation extension act of August 13, 1914 (38 Stat., 686), provides "that whenever water is available and it is impracticable to apportion operation and maintenance charges as provided in section five of this act, the Secretary of the Interior may, prior to giving public notice of the construction charge per acre upon land under any project, furnish water to any entryman or private landowner thereunder until such notice is given, making a reasonable charge therefor, and such charges shall be subject to the same penalties and to the provisions for cancellation and collection as herein provided for other operation and maintenance charges."

2. And whereas water is available during the irrigation season of 1917 for the irrigation of approximately 23,500 acres under the control of entrymen and private landowners under the gravity unit of the Grand Valley project, Colorado, the lands for which water is available being shown on conforming farm-unit plats approved January 25, 1917, by the Secretary of the Interior and on file at the local land office at Montrose, Colo., and the office of the project manager, United States Reclamation Service, Grand Junction, Colo.

3. Now, therefore, announcement is hereby made that water will be furnished during the irrigation season of 1917 to the lands referred

to above at the rate of 40 cents per acre-foot upon the presentation of a duly executed application in the prescribed form at the project office and payment of the water charge in advance.

4. The attention of landowners and entrymen is invited to the fact that under the provisions of section 5 of said reclamation extension act, after the project is opened under public notice, each irrigable acre whether irrigated or not will be charged with a minimum operation and maintenance charge. Only a few landowners are able to level and put under cultivation all their holding in one year, and therefore water users will generally find it to their advantage to put a portion of their land in cultivation while it is permissible to pay water charges only on the acreage actually irrigated.

FRANKLIN K. LANE,
Secretary of the Interior.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix p. 480.]

Feature costs of Grand Valley project, June 30, 1917.

Principal feature.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys	$4,801.57	$74,546.69
Pumping for irrigation, surveys	2,977.87	2,977.87
Canal system:		
Grand River diversion dam	7,096.31	513,761.64
Canyon division	1,276.05	997,553.69
Division No. 2	2,723.76	474,284.26
Division No. 3	3,151.67	293,051.85
Division No. 4	89,725.53	329,654.64
Total canal system	103,973.32	2,608,306.08
Lateral system:		
Lateral District No. 1	5,261.94	125,440.47
Lateral District No. 2	26,147.31	104,103.55
Lateral District No. 3	53,433.51	56,791.84
Total lateral system	84,842.76	286,335.86
Drainage system:		
Project	4,269.33	6,587.36
Grand Valley drainage district	14,326.80	25,180.13
Cooperative drainage	778.17	778.17
Total, drainage system	19,374.30	32,545.66
Flood protection	9,745.95	10,381.49
Farm units	156.54	3,687.36
Permanent improvements	587.58	1,272.65
Telephone system	[1] 23.86	11,794.30
Operation and maintenance during construction	29,305.01	33,955.41
Plant accounts	7.48	14,484.38
Unadjusted clearing accounts	2,805.37	2,805.37
Gross construction cost to June 30, 1917	258,553.89	3,083,093.12
Less revenues earned during construction period:		
Rental of buildings	437.21	1,765.07
Rental of grazing and farming lands	5.00	1,476.74
Rentals, power and light		259.92
Rentals of irrigation water	3,772.85	4,960.65
Rentals of telephones and tolls		15.65
Contractors' freight refunds	2,500.00	2,500.00
Forfeitures by defaulting bidders and contractors	473.00	703.00
Other revenues, unclassified	13.31	17.81
Profit on messhouse operations	[1] 3,786.28	6,880.95
Profit on mercantile store operations	115.02	1,323.07
Profit on hospital operations	580.55	3,777.29
Profit on farming operations	[1] 3,512.81	[1] 3,512.81
	597.85	20,167.34
Net cost of construction of project to June 30, 1917		3,062,925.78

[1] Deduct.

Statement of cost by calendar years, Grand Valley project.

Year ending Dec. 31—	Construction.	Operation and maintenance during construction.	Total cost
Prior to Dec. 31, 1911	$82,366.98		$82,366.98
1912	245,449.57		245,449.57
1913	432,928.81		432,928.81
1914	1,058,596.01		1,058,596.01
1915	838,600.39		838,600.39
1916	277,225.60	$19,458.25	296,683.85
Jan. to June 30, 1917	96,680.60	14,497.16	111,177.76
Plant and clearing accounts to June 30, 1917	17,289.75		17,289.75
Total	3,049,137.71	33,955.41	3,083,093.12

Statement of cost by fiscal years, Grand Valley project.

Year ending June 30.	Construction.	Operation and maintenance during construction.	Total cost.
Prior to June 30, 1912	$265,461.64		$265,461.64
1913	188,772.93		188,772.93
1914	668,889.51		668,889.51
1915	1,357,472.93		1,357,472.93
1916	324,814.92	4,650.40	329,465.32
1917	229,248.88	29,305.01	258,553.89
Plant and clearing accounts to June 30, 1916	14,476.90		14,476.90
Total	3,049,137.71	33,955.41	3,083,093.12

Estimated cost of contemplated work Grand Valley project during fiscal year 1918.

Features.	Sub-feature.	Principal feature.
Examination and surveys, hydrometry		$150
Pumping for irrigation, surveys		3,100
Canal system:		
Grand River Dam	$900	
Main canal—		
Surveys	700	
Canals	7,000	
Bridges	2,100	
		10,700
Lateral system:		
Districts 1, 2, and 3—		
Surveys	1,300	
Laterals	4,600	
Minor structures	5,600	
		10,500
Drainage system:		
Project, surveys	3,000	
Grand Valley drainage district, surveys	3,000	
Cooperative work	70,400	
		76,400
Flood protection:		
Surveys	1,500	
Levees and dykes	26,900	
		28,400
Irrigable lands, surveys		10,300
Permanent improvements, ditch riders' quarters, etc		2,100
Telephone system, pole lines		100
Operation and maintenance during construction (water rental):		
Canals and structures	20,000	
Hydrometry	650	
Repairs and replacements	6,400	
		27,050
Operation and maintenance under public notice		22,500
Stores and other operations		700
Total		192,000

COLORADO, UNCOMPAHGRE VALLEY PROJECT.

F. D. Pyle, project manager, Montrose, Colo.

LOCATION.

Counties: Montrose and Delta.

Townships: 15 S., Rs. 94 to 96 W., sixth principal meridian; 48 to 51 N., Rs. 7 to 12 W., New Mexico meridian.

Railroad: Denver & Rio Grande.

Railroad stations and estimated population January 1, 1917: Montrose, 3,500; Olathe, 600; and Delta, 2,600.

WATER SUPPLY.

Sources of water supply: Gunnison and Uncompahgre Rivers.

Area of drainage basins: Gunnison River, 3,850 square miles; Uncompahgre River, 500 square miles.

Run-off in acre-feet: April to November, inclusive, Gunnison River at River Portal (3,850 square miles), 1905 to 1916: Maximum, 1,737,300; minimum, 884,550 mean, 1,337,000. Uncompahgre River at Fort Crawford (500 square miles), 1896–1899, 1903–1905, 1908–1916: Maximum, 256,700; minimum, 128,700; mean, 161,100.

LANDS OPENED FOR IRRIGATION.

Forty-nine farm units were opened to entry on June 30, 1916, to permit preferential-right entrymen to exercise their rights. All lands irrigated from canals operated by the Reclamation Service were furnished water under rental contracts.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service is prepared to supply water, season of 1917: Estimated at 90,000 acres.

Area under rental contracts, season of 1917: Estimated at 80,000 acres.

Area irrigated, season of 1916: 49,273 acres.

Length of irrigating season: From April 1 to October 31, 214 days, on all Government canals except the Loutsenhizer, under which the season ends November 15.

Average elevation of irrigable area: 5,500 feet above sea level.

Rainfall on irrigable area: 17 years, average 9.55 inches; 1916, at Montrose, 13.13 inches.

Range of temperature on irrigable area: −25° to 98° F.

Character of soil of irrigable area: Red sandy gravel, adobe, and clay loam.

Principal products: Alfalfa, grain, fruits, sugar beets, potatoes, onions, and vegetables.

Principal markets: Denver, Colo.; Chicago, Ill.; and local mining camps.

CHRONOLOGICAL SUMMARY.

Reconnoissance and preliminary surveys begun in June, 1901.
Construction recommended by director March 7, 1903.
Construction conditionally authorized by Secretary, March 14, 1903.
Construction authorized by Secretary, June 7, 1904.
Contract for construction of Gunnison Tunnel approved October 18, 1904.
First irrigation by Reclamation Service, season of 1908.
Gunnison Tunnel completed for present use June, 1910.
Gunnison River diversion dam completed January, 1912.
Entire project 93 per cent completed June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the Uncompahgre Valley project provides for the diversion of water from the canyon of the Gunnison River by means of a tunnel 6 miles long and a canal 11 miles long to supplement the flow of the Uncompahgre River, and in addition thereto the utilization of all waste, seepage, spring, percolating, and return water arising within the project in the irrigation of lands in the Uncompahgre Valley. To distribute the waters of the Uncompahgre and Gunnison Rivers thus combined,

7 other canal systems are either constructed or in the process of construction, all of which will take water from the Uncompahgre River, except the West Canal, which will divert directly from the South Canal by a flume over the Uncompahgre River, although an auxiliary supply can be taken from the river by a feeder canal—the old Boomer ditch. The construction of the various canal systems included the purchase, enlargement, and extension of the more important private ditches that were acquired by the United States.

The surveys for and diamond-drilling investigation of the Taylor Park Reservoir have been completed, but no construction work has been undertaken. The diversion dam in the Gunnison River is completed. The Gunnison Tunnel is completed to the extent necessary for its present use. The South, West, Montrose and Delta, Selig, East, and Garnet canal systems are completed, except for the installation of measuring devices and other minor structures, and the excavation, enlargement, and extension of a few small laterals. The Loutsenhizer system is completed, except for the installation of measuring devices and other minor structures, and the purchase of outstanding Loutsenhizer water rights. The excavation of, and building of structures on, the main line of the Ironstone canal system have been completed, and considerable progress has been made in building the lateral system and in purchasing outstanding shares of the old Ironstone and Ironstone extension ditches.

SUMMARY OF GENERAL DATA FOR UNCOMPAHGRE VALLEY PROJECT, TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is complete		100,000
Public land entered to end of fiscal year	16,480	
Public land withdrawn at end of fiscal year	7,586	
Private land	75,934	
Acreage service could have supplied season of 1916		77,713
Estimated addition in fiscal year 1917		12,287
Estimated addition in fiscal year 1918		10,000
Estimated acreage service can supply July 1, 1918		100,000
Acreage actually irrigated, season of 1916		49,273
Acreage cropped under irrigation, season of 1916		48,352
Crops:		
Value of irrigated crops, season of 1916		$1,949,529.00
Value of irrigated crops per acre cropped		$40.32
Finances:		
Gross construction cost to end of fiscal year		$6,794,158.21
Per cent complete at end of fiscal year		93
Appropriated for fiscal year 1918, total		$398,000.00
Allotment for construction, fiscal year 1918		$250,000.00
Estimated per cent complete, June 30, 1918		96
Proposed appropriation, fiscal year 1919, for construction		$62,000.00
Estimated gross construction expenditures to June 30, 1919		$7,177,147.17
Estimated per cent complete, June 30, 1919		98
Appropriation, fiscal year 1917		[1]$388,948.03
Expenditures during fiscal year, chargeable to 1917 appropriation—		
Disbursements and transfers	$261,849.21	
Registered liabilities chargeable to 1917 appropriation	64,582.26	
		326,431.47
Unencumbered balance, July 1, 1917		62,516.56
Repayments:		
Water rental charges—		
Accrued to end of fiscal year		$457,069.94
Collected to end of fiscal year		$456,771.94
Uncollected at end of fiscal year		$298.00
Drainage:		
Estimated acreage damaged by seepage to end of fiscal year		16,300
Cost of drainage works to end of fiscal year (surveys)		$3,494.72

[1] Includes refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

CONSTRUCTION DURING FISCAL YEAR.

Taylor Park Reservoir.—Hydrographic investigations were continued.

Gunnison Tunnel.—A crusher plant was built at the East Portal. The bulging walls on the left side between Stations 189+35 and 191+38 were repaired, 270 cubic yards of concrete being required. The floor was plastered between Station 200+10 and Station 266+25; this work required 210 cubic yards, or 7,130 square yards of plaster. New concrete lining was placed consisting of 8 concrete approaches to intermediate sections, 248 linear feet of sidewalls, and 146 linear feet of arch; this work involved the placing of 880 cubic yards. The testing apparatus for observing the water levels was installed and miscellaneous work, such as removing ties, repairing Portal Cut lining, and remodeling buildings, was accomplished.

South Canal system.—The old timber outlet diversion into the Uncompahgre River from the South Canal main line was replaced with a concrete structure, which involved the placing of 290 cubic yards of concrete. Three turnouts were built on the main line, and 25 drops, 5 turnouts, 5 measuring devices, 1 flume, and 1 check were built on the lateral system.

West Canal system.—The West Canal extension siphon lateral was completed during the year. The siphon, consisting of 2,100 linear feet of 12-inch wooden stave pipe, was supported on wooden cradles placed on the ground surface. The wasteway lateral leading from the siphon into the Franklin Mesa lateral involved the excavation of 980 cubic yards. Four turnouts, 3 measuring devices, 3 drops, 1 culvert, and 1 bridge, all timber structures, were built on the lateral system.

Montrose and Delta Canal system.—An extension lateral to the Chipeta was built, involving the excavation of 2,050 cubic yards. Fifteen drops, 11 measuring devices, 28 turnouts, 4 culverts, 7 bridges, and 1 check, all timber structures, were built on the lateral system.

Loutsenhizer Canal system.—A few minor structures were built. The acquisition of outstanding water rights was continued.

Selig Canal system.—The excavation of the Peach Valley lateral by the Orman Construction Co. was completed. The Burbank Ditch was excavated under an informal contract of July 5, 1916, with J. J. Halliday; 6,846 cubic yards were excavated. The building of structures required on the Peach Valley lateral was completed. Miscellaneous timber structures were built on the lateral system.

Ironstone Canal system.—A few minor structures were built on the main line. Government forces resumed work during the winter season on the enlargement of existing laterals on California Mesa; 38,489 cubic yards were excavated. The following minor structures were built on the lateral system—86 drops, 1 check, 4 wasteways, 46 turnouts, 25 bridges, 5 drains, 5 measuring devices, and 1 combination structure. A semicircular steel flume 650 feet long was built on the Buttermilk lateral. Proposals were received on September 15, 1916, for the excavation of the Ironstone Canal extension, the Buttermilk lateral, and a portion of California Mesa Lateral No. 3; all bids were rejected and the excavation of the Buttermilk lateral

readvertised. The excavation of the Buttermilk lateral (34,440 cubic yards) was accomplished under field contracts as follows: Schedule 1 with The Orman Construction Co., dated November 3, 1916; schedule No. 2 with J. J. Halliday, dated October 24, 1916; schedules 3 and 4 with J. D. Brock and F. E. Wiggins, dated October 16, 1916, and schedules 5 and 6 with The Orman Construction Co., dated October 14, 1916. The necessary right of way was obtained as required on the lateral system. Agreements were entered into for the transfer to the United States of 10 per cent or 33 shares of the Ironstone Ditch stock, making a total of 258 shares or 80 per cent of this stock which has been acquired by the United States to the end of the fiscal year.

East Canal system.—The bench flume or lined channel on the main line through the town of Olathe was fenced. Five drops, 1 check, 1 wasteway, and 16 turnouts were built on the lateral system.

Garnet Canal system.—Three timber drops and 1 check were built.

Drainage system.—Certain sections of the 8-inch experimental tile drain along the South Canal were taken up, examined, tested, and replaced by other tile. The observations of the fluctuation of the water level in the drainage test holes was continued, three sets of observations in the various districts being taken.

Farm units.—The field work in connection with the measurement and classification of the irrigable area was completed. Final farm unit plats were prepared.

Permanent improvements and land.—Section houses were built at the East Canal headworks, on the King lateral extension, and on California Mesa Lateral No. 3.

SEEPAGE AND DRAINAGE.

Considerable areas in the Uncompahgre Valley are suffering from an excess of ground water, largely caused by excessive and careless use of irrigation water. This condition is no doubt aggravated by the system in use of furnishing water on a continuous flow basis. Seeped areas contain excessive quantities of alkali and are by no means confined to the river bottoms or low lands contiguous to the mesas. About 6,700 acres have been drained in the valley. Some of this work was done by individual farmers but all the larger undertakings were carried through by drainage contractors. The cost per acre for drainage varies from $25 to $75, depending upon the distance the tile trenches have to be carried to secure an outlet.

Preliminary drainage surveys were begun during the spring of 1915, but no drainage construction has been accomplished by the service.

ECONOMIES OF GOVERNMENT WORK.

On September 15, 1916, two bids were received for the excavation of the Buttermilk Lateral, approximating $12,625. These bids were rejected and the work was readvertised and completed under field contracts at a total cost of $7,471.52.

BOARD AND OTHER REPORTS.

Date.	Subject.	Personnel.
Feb. 5,1916	Report of Central Board of Review on the Uncompahgre Valley project.	Elwood Mead, W. L. Marshall, I. D. O'Donnell.
Dec. 16,1916	Gunnison Tunnel capacity	D. C. Henny, A. J. Wiley, E. A. Moritz.

OPERATION AND MAINTENANCE.

During the season of 1916 the Reclamation Service supplied and distributed water for the irrigation of 49,273 acres of land, 4,156 acres of which were supplied from the South Canal system; 3,826 acres from the West Canal system; 16,843 acres from the Montrose and Delta Canal system; 3,818 acres from the Loutsenhizer Canal system; 4,053 acres from the Selig Canal system; 10,764 acres from the Ironstone Canal system; 4,339 acres from the East Canal system; and 1,474 acres from the Garnet Canal system. The Logan and North Mesa Canals, the owners of which have entered into agreements to transfer them to the United States, were supplied with Gunnison water. Gunnison water was also rented to the Ouray Ditch.

During the season 329,564 acre-feet of water were diverted into canals operated by the service, of which 299,432 acre-feet were delivered to the land. All water was furnished on a continuous flow rental basis; the charge was $80 per second-foot per season for all consumers under all canal systems, except as noted below. The consumers under the Loutsenhizer, Selig, and East Canal systems who possessed water rights in the old Loutsenhizer Ditch were furnished water at the rate of $20 per second-foot for Uncompahgre priority water and $60 additional per second-foot for supplemental Gunnison water. A few consumers under the Montrose and Delta Canal system were furnished Uncompahgre priority water at rates varying from $36 to $40, depending upon the terms of the contracts they held with the old private canal company. The water appurtenant to the stock in the Ironstone Canal was carried for $5 per share; Ironstone Extension stock $3 per share; Delta Chief stock $2 per share; Homerun stock $1.50 per share; and Chipeta stock 25 cents per share. Private canals were furnished Gunnison water at the South Canal outlet at the rate of $60 per second-foot per season. Water was diverted into the Chipeta Beaudry Ditch from the Garnet Canal for $100 per season. All water rentals were paid in advance.

No particular difficulties were experienced in operating and maintaining the system during the 1916 irrigation season. During the spring floods the usual expense was incurred in protecting canal headgates and preventing them from clogging with drift and other foreign material. The season of 1916 was favorable on account of lack of high water in both the Uncompahgre River and the cross-drainage channels. During the spring floods of 1917 considerable riprap work was required to keep the river from cutting away from the headgates. The South Canal was shut down twice for a total of three days in order to make repairs to the concrete at the bottom of the canal at a point above Tunnel No. 4. A small break occurred in the West Canal which necessitated a shutdown of one day. Sev-

eral new slides developed on both the upper and lower sides of the sidehill sections of the Montrose and Delta Canal Main Line; the upper slides were caused from irrigation of the mesas under the West Canal system; no break occurred however which interfered with the flow of water. The King Lateral Extension was shut down for a period of two days to repair a break caused by floods. A 36-inch concrete pipe culvert under the Loutsenhizer Canal disintegrated and was replaced with a 36-inch corrugated pipe culvert. A small slide occurred on the Selig side hill and the system was shut down for four days during the spring of 1917 in order to remove gravel. The Ironstone Canal system was shut down for four days in order to repair a slide west of Olathe. A tunnel was driven in the shale under the Ironstone Main Line in order to relieve the seepage condition at the bench flume. Between the 1916 and 1917 irrigation seasons the following work was accomplished: A 48-inch corrugated iron culvert was placed inside the old partly disintegrated concrete culvert at milepost 5 on the South Canal; 388 linear feet of new concrete floor and 340 linear feet of new concrete sidewalls were placed on top of the old lining of the South Canal near milepost 4; and 6,615 linear feet of tunnel floor were plastered and 203 linear feet of bulging side walls replaced with new concrete.

During the irrigation season the operating force was employed in regulating the distribution of water and in making minor repairs and during the remainder of the year, weather permitting, the same force was engaged in clearing the canals of vegetable growth and deposits of sand and gravel and in repairing and installing minor structures.

Historical review, Uncompahgre Valley project.

Item.	1912	1913	1914	1915	1916	1917 [1]
Acreage for which service was prepared to supply water	44,500	48,000	52,338	62,147	77,713	90,000
Acreage irrigated	27,887	31,428	33,873	41,463	49,273	58,000
Miles of canal operated	210.7	228	279.5	355.8	406.45	430
Water diverted, acre-feet	139,932	182,191	183,342	264,060	329,564	360,000
Water delivered to land, acre-feet	133,912	160,056	171,268	231,271	299,432	325,000
Per acre of land irrigated, acre-feet	4.81	5.09	5.06	5.56	6.08	5.60

[1] Estimated.

SETTLEMENT.

No public land under this project is open to entry and no public notices have been issued, except the general public notice issued September 24, 1914. The Secretary of the Interior, under date of June 30, 1916, issued an order throwing open to entry 49 farm units on which 31 men held preferential rights. The only settlement that has taken place during the year has been due to the transfer of private lands, to the subdivision into smaller tracts of the larger holdings, and to the additional farm units entered under the preferential land opening order of June 30, 1916. The project agricultural adviser continued his work in connection with the promotion of feeding and milking tests and the importation of high grade and registered stock.

There is no experiment farm on the project, but considerable interest is manifested in the experimental work of the Colorado Agricultural College. Once each year an agricultural special train passes through the State and spends several hours in each of the principal agricultural towns; exhibits of various crops are shown and lectures given, and this yearly demonstration has proven to be of great interest and success. Specialists have been sent out by the United States Department of Agriculture, the Colorado State Agricultural College, and the agricultural department of the Denver & Rio Grande Railroad Co. to effect permanent organizations in all the principal towns in the interest of better farming. Domestic science, corn, potato, pig, and other clubs have been organized in the district schools, and their work is supervised by the professor of agriculture of the Montrose County High School. The granges of the valley are doing good work in securing better prices for products raised and in promoting better farming. Products of the valley have been exhibited at various fairs held in Denver, Pueblo, Chicago, and El Paso, and many premiums have been awarded to the exhibitors of agricultural products and live stock. The annual Western Slope Fair held in Montrose during September was a success in all respects. Community welfare conferences were held in Montrose and Delta during the spring.

Settlement data: Uncompahgre Valley project.

Item.	1912	1913	1914	1915	1916
Total number of farms on project	1,245	1,344	910	1,107	1,320
Population	5,171	4,265	2,942	3,561	4,403
Number of irrigated farms	1,245	1,344	910	1,107	1,320
Operated by owners or managers	(1)	839	551	615	713
Operated by tenants	(1)	505	359	492	607
Population	5,171	4,265	2,942	3,561	4,403
Number of towns	3	3	3	3	3
Population	6,320	6,400	6,500	6,500	6,700
Total population in towns and farms	11,491	10,665	9,442	10,061	11,103
Number of public schools	22	22	22	24	26
Number of churches	(1)	22	26	26	27
Number of banks	(1)	(1)	8	8	8
Total capital stock	(1)	(1)	$360,000	$360,000	$360,000
Total amount of deposits	(1)	(1)	$1,692,612	$1,556,963	$2,750,000
Total number of depositors	(1)	(1)	5,950	5,975	8,100

[1] No data.

The data given for the years 1914, 1915, and 1916, under items 1 to 6, inclusive, apply only to the farms irrigated from canals operated by the service. The data for other years include farms irrigated from private canals.

CROPS.

The general prosperity and financial condition of the project improved considerably over those prevailing at the close of 1915. This improvement is due to the combination of excellent crop yields with war prices. The yields were above normal for all except the fruit crop. Alfalfa, wheat, oats, potatoes, apples, and sugar beets had the largest acreage in the order named; onions, potatoes, corn ensilage, and sugar beets gave the largest return per acre of crop; potatoes, alfalfa, wheat, sugar beets, and oats gave the largest per-

centage of the total returns. The increased acreage of alfalfa was due to the increase in the live-stock industry and to the realization of the value of alfalfa as a rotation crop. The increase in sugar beets was due to increased prices offered by the sugar company. The increased acreage of corn was the largest of any crop and was due to the remarkable success obtained by many farmers during the previous season and to the increase in the hog industry. The increased acreage of wheat was due to the high prices prevalent during the past few years. The decreased acreage of potatoes was due to poor returns for several years. The decreased yield of alfalfa and failure of the fruit crop were due to the heavy freeze of May 16, 1917. The outlook for 1917 is good for all crops.

Crop report, Uncompahgre Valley project, Colorado, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay	19,105	Tons	50,341	2.6	$7.32	$368,685	$19.30
Alfalfa seed	288	Bushels	1,592	5.5	10.13	16,122	55.98
Apples	2,406	Pounds	1,087,100	452	.016	17,439	7.25
Barley	503	Bushels	14,120	28.1	1.01	14,294	28.41
Beans	259	do	3,781	14.5	4.22	15,976	61.68
Beets, sugar	2,023	Tons	22,635	11.2	5.91	133,850	66.11
Clover hay	197	do	301	1.5	7.00	2,107	10.70
Clover seed	5	Bushels	12	2.4	4.50	54	10.80
Corn, Indian	1,725	do	67,118	38.9	.87	58,065	33.66
Corn, fodder	344	Tons	4,329	12.6	3.40	14,716	42.78
Corn, ensilage	85	do	915	10.8	6.66	6,090	71.65
Fruits, small	72	Pound	57,750	802	.075	4,317	59.96
Garden	144					9,369	65.06
Hay	564	Tons	747	1.3	7.48	5,585	9.90
Oats	6,438	Bushels	218,456	33.9	.55	120,927	18.78
Onions	262	do	87,730	334.9	1.11	97,073	370.49
Pasture	1,936					18,632	9.62
Peaches	132	Pounds	875	7	.03	26	.20
Pears	12	do	16,600	1,383	.039	642	53.50
Peas	32	Bushels	840	26.2	1.35	1,146	35.81
Prunes	14	Pounds	3,250	232	.02	65	4.64
Potatoes, white	3,714	Bushels	756,624	203.7	.97	733,923	197.61
Rye	27	do	343	12.7	1.16	399	14.78
Wheat	9,038	do	235,616	26.1	1.28	301,763	33.39
Miscellaneous	151					8,264	54.73
Less duplicated areas	1,124						
Total cropped acreage	48,352	Total and average				1,949,529	40.32

		Areas.	Acres.	Farms.	Per cent of project.
Irrigated, no crop:		Irrigable area farms reported	77,713	1,320	56
Nonbearing orchard	645	Irrigated area farms reported	49,273	1,320	35
Young alfalfa	2,483	Under water-right applications			
Ground fall-plowed	1,938	Under rental contracts	49,273	1,320	35
Miscellaneous	22	Cropped area farms reported	48,352	1,320	34
Less duplicated areas	4,167				
Total irrigated acreage	49,273				

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves and capital, given in appendix, p. 482.]

Feature costs of Uncompahgre project, June 30, 1917.

Principal feature.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys	$6.25	$96,467.70
Storage works (Taylor Park Dam)	.....	12,698.92
Canal system:		
Diversion dam and headworks	.....	115,604.64
Gunnison tunnel	21,856.10	3,010,769.67
South Canal	5,117.70	861,961.98
	26,973.80	3,988,336.29
Lateral system:		
South	2,433.64	49,202.55
West	2,443.45	270,466.84
Montrose and Delta	5,740.85	553,416.85
Loutsenhizer	27,830.96	136,928.66
Selig	9,616.40	344,665.67
Ironstone	100,512.95	339,601.93
East	1,999.03	261,866.98
Garnet	306.36	5,226.98
	150,883.64	1,961,376.46
Drainage	702.37	3,494.72
Power system (preliminary and general work)	.....	273.85
Farm units	10,893.38	35,417.60
Permanent improvements	1,536.64	59,646.40
Telephone system	.....	6,788.48
Operation and maintenance during construction (water-rental basis)	113,099.66	618,646.75
Plant accounts	6,422.44	11,011.04
Gross construction cost to June 30, 1917	310,518.18	6,794,158.21
Less revenues earned during construction period:		
Rental of buildings	478.60	18,869.58
Rental of grazing and farming lands	2.00	2.00
Rentals of irrigation water	87,328.43	457,069.94
Contractors' freight refunds	25.00	2,671.66
Other revenues, unclassified	6.00	11.00
Profit on mess-house operations	[1] 2,031.18	5,544.13
Profit on mercantile store operations	.....	20,119.14
Profit on hospital operations	785.75	4,014.43
	86,594.60	508,602.18
Net cost of construction of project to June 30, 1917	.....	6,285,556.03

[1] Deduct.

Statement of cost by calendar years, Uncompahgre project.

Year ending Dec. 31—	Construction.	Operation and maintenance during construction.	Total cost.
1904 [1]	$66,088.02	.....	$66,088.02
1905	623,904.17	.....	623,904.17
1906	1,199,879.82	.....	1,199,879.82
1907	904,910.39	.....	904,910.39
1908	541,230.15	$7,723.63	548,953.78
1909	594,384.50	21,331.50	615,716.00
1910	414,994.51	45,621.97	460,616.48
1911	274,704.21	47,156.30	321,860.51
1912	279,060.25	71,197.61	350,257.86
1913	267,755.55	104,523.62	372,279.17
1914	295,499.72	71,089.73	366,589.45
1915	301,819.68	89,569.33	391,389.01
1916	283,855.19	89,997.26	373,852.45
January to June 30, 1917	116,414.26	70,435.80	186,850.06
Plant accounts to June 30, 1917	11,011.04	.....	11,011.04
Total	6,175,511.46	618,646.75	6,794,158.21

[1] Includes years 1902 to 1904, inclusive.

Statement of cost by fiscal years, Uncompahgre project.

Year ending June 30—	Construction.	Operation and maintenance during construction.	Total cost.
1905[1]	$131,304.58	.....	$131,304.58
1906	1,130,248.77	.....	1,130,248.77
1907	1,118,883.07	.....	1,118,883.07
1908	610,901.02	$1,740.71	612,641.73
1909	664,653.48	17,504.38	682,157.86
1910	567,272.09	21,148.27	588,420.36
1911	253,221.37	59,804.71	313,026.08
1912	307,552.80	62,056.19	369,608.99
1913	197,088.86	83,920.94	281,009.80
1914	298,128.54	87,665.42	385,793.96
1915	383,917.56	72,820.40	456,737.96
1916	310,332.20	98,886.07	409,218.27
1917	197,418.52	113,099.66	310,518.18
Plant accounts to June 30, 1916	4,588.60	.....	4,588.60
Total	6,175,511.46	618,646.75	6,794,158.21

[1] Includes years 1902 to 1905, inclusive.

Estimated cost of contemplated work, Uncompahgre Valley project, during fiscal year 1918.

Features.	Estimated cost during fiscal year 1918.	
	Sub-feature.	Principal feature.
Storage system	.....	$2,000
Canal system:		
Gunnison River weir	$500	.....
Gunnison tunnel	102,500	.....
South Canal main line	7,000	.....
		110,000
Lateral system:		
South Canal system	10,000	.....
West Canal system	1,000	.....
Montrose and Delta Canal system	3,000	.....
Loutsenhizer Canal system	27,000	.....
Selig Canal system	5,000	.....
Ironstone Canal system	43,000	.....
East Canal system	2,000	.....
Garnet Canal system	1,000	.....
		92,000
Drainage system	.....	4,000
Farm units	.....	1,000
Permanent improvement	.....	1,000
Operation and maintenance during construction (water rentals)	.....	110,000
Stores and other operations	.....	2,000
Plant and equipment	.....	10,000
Total	.....	332,000

IDAHO, BOISE PROJECT.

D. W. Cole, senior engineer, Boise, Idaho.

LOCATION.

Counties: Ada, Boise, Canyon, and Elmore.

Townships: 1 S. to 5 N., Rs. 6 W. to 6 E., Boise meridian, and Tps. 21 and 22 S., R. 46 E., Willamette meridian.

Railroads: Oregon Short Line; Boise, Nampa & Owyhee, and Idaho Northern (now branches of Oregon Short Line); Boise Valley Traction; Caldwell Traction; and Intermountain.

Railroad stations and estimated population January 1, 1917: Boise, 25,000; Nampa, 4,500; Caldwell, 4,500; Meridian, 650; Kuna, 250; Wilder, 150; Bowmont, 50; and Melba, 25.

WATER SUPPLY.

Source of water supply: Boise River.

Area of drainage basin: 2,610 square miles.

Annual run-off in acre-feet of Boise River near Highland (2,610 square miles), 1895 to 1916: Maximum, 3,829,800; minimum, 1,119,530; mean, 2,600,700.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service is prepared to supply water season of 1917: 223,866 acres, including 80,056 acres of vested water-right lands.

Area under water-right applications and rental contracts season of 1917: 115,000 acres.

Area under special contracts: 80,056 acres.

Length of irrigation season: From April 1 to October 31—214 days.

Average elevation of irrigable area: 2,500 feet above sea level.

Rainfall on irrigable area: At Boise station for 34 years, average, 12.77 inches; 1916, 14.64 inches.

Range of temperature on irrigable area: −28° to 107° F.

Character of soil of irrigable area: Clayey loam, light sandy loam, and sandy loam.

Principal products: Alfalfa, wheat, oats, clover, potatoes, apples, prunes, and small fruits.

Principal markets: Boise, Nampa, Caldwell, and Meridian, Idaho; Portland, Oreg., and eastern cities.

LANDS OPENED FOR IRRIGATION.

The project was opened under public notice of July 21, 1917.

Limit of area of farm units: Public, 80 acres; private, 160 acres.

CHRONOLOGICAL SUMMARY.

Reconnoissance made and preliminary surveys begun in 1902.

Construction recommended by board of engineers February 15, 1905.

Construction authorized by Secretary March 27, 1905.

Main canals of New York Canal Co. and Idaho-Iowa Lateral & Reservoir Co. acquired March 3, 1906.

First irrigation by Reclamation Service, season of 1906.

Boise River Dam completed September, 1908.

Upper Deer Flat embankment completed March, 1911.

Deer Flat Forest embankment completed June, 1911.

Lower Deer Flat embankment completed January, 1912.

Boise River power plant completed May, 1912.

Arrowrock Dam completed November, 1915.

Pioneer district drainage completed June, 1916.

Pioneer and Nampa & Meridian districts cooperative drainage begun December, 1915, and completed June, 1917.

Nampa & Meridian district drainage begun December, 1915, and 98 per cent completed June 30, 1917.

Project 99 per cent completed June 30, 1917 (not including extensions).

IRRIGATION PLAN.

The irrigation plan of the Boise project provides for storage of water in the Arrowrock Reservoir on Boise River, about 22 miles above Boise, and in the Deer Flat Reservoir near Caldwell and Nampa, Idaho; the diversion of water from Boise River by the Boise River Dam, about 8 miles above Boise; the distribution of water on the south side of Boise River, through the Main Canal, leading from the dam to the Deer Flat Reservoir; distributing laterals heading in the Main Canal: distributing canals heading in the Deer Flat Reservoir; and distributing canal systems heading in the Boise River below the Boise River Dam; and the distribution of water on the north side of the Boise River to a small area of land east of Boise through a canal system heading at the Boise River Dam. The United States claims all waste, seepage, spring, and percolating water arising within the project, and proposes to use such water in connection therewith.

SUMMARY OF GENERAL DATA FOR BOISE PROJECT, TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is complete (including proposed extensions, pumping areas)		277,366
Public land entered to end of fiscal year	77,003	
Public land withdrawn at end of fiscal year	3,191	
State land	6,960	
Private land	190,212	
Acreage service could have supplied season of 1916		223,866
Estimated acreage service can supply July 1, 1918		223,866
Acreage actually irrigated, season of 1916		[1] 101,315
Acreage cropped under irrigation, season of 1916		[1] 96,360
Crops:		
Value of irrigated crops, season of 1916		[2] $2,327,494.00
Value of irrigated crops, per acre cropped		[2] $32.07
Finances:		
Gross construction cost to end of fiscal year		$12,487,390.64
Per cent complete at end of fiscal year (except extensions)		99
Appropriated for fiscal year 1918, total		$396,000.00
Allotment for construction, fiscal year 1918		$302,800.00
Estimated per cent complete, June 30, 1918 (except extensions)		100
Proposed appropriation, fiscal year 1919 for construction		$500,000.00
Estimated gross construction expenditures to June 30, 1919		$13,290,190.64
Estimated per cent complete, June 30, 1919 (except extensions)		100
Announced construction charges per acre		$70 and $80
Appropriation, fiscal year 1917		[3] $1,691,695.25
Expenditures during fiscal year, chargeable to 1917 appropriation—		
Disbursements	$465,523.89	
Transfers	237.77	
	$465,761.66	
Registered liabilities chargeable to 1917 appropriation	17,932.97	
		483,694.63
Unencumbered balance, July 1, 1917		1,208,000.62

[1] Exclusive of lands in Nampa-Meridian and Pioneer irrigation districts having partial vested water rights.

[2] For 72,581 acres covered by crop reports.

[3] Includes balance of 1916 appropriation and refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

Repayments:		
Water-rental charges—		
Accrued to end of fiscal year		$510,923.24
Collected to end of fiscal year		492,022.24
Uncollected at end of fiscal year		18,901.00
Power earnings—		
Accrued to end of fiscal year		64,126.21
Collected to end of fiscal year		64,126.21
Drainage:		
Estimated acreage damaged by seepage to end of fiscal year		18,750
Miles of drains built to end of fiscal year—		
Open	131.9	
Closed	0.8	
		132.7
Estimated acreage protected by drains built to end of fiscal year		83,500
Estimated acreage to be protected by authorized system		83,500
Cost of drainage works to end of fiscal year		$677,054.18

CONSTRUCTION DURING FISCAL YEAR.

Storage unit (Arrowrock Reservoir and related features).—The main Arrowrock Dam was completed in 1915, but there remained various supplementary work which was completed during the fiscal year 1917. The large construction plant at the dam was dismantled and the various equipment transferred to other projects, sold for cash, retained for project use, or stored in the material yard to await more favorable opportunity for sale. The completion and adjustment of the spillway gates; the erection of a 7-ton Gantry crane for traversing the top of the dam to facilitate handling heavy gate machinery; the construction of a section of the highway in Deer Creek gorge, and the clearing of the premises generally, including the clearing of débris from the reservoir, completed the storage unit.

As authorized by act of Congress of August 11, 1916, the Boise & Arrowrock Railroad was appraised by a board appointed by the Secretary of the Interior, composed of Gen. W. L. Marshall, C. H. Swigart, and A. J. Wiley. The railroad was duly advertised and offered for sale at public auction on January 10, 1917. Section 2 of the railroad was knocked down at the appraised value. No bids were received for section 1, but subsequently this was sold to the Intermountain Railway Co. for use as a logging railway. The returns from the two sales amounted to $87,793. Sidetracks, rolling stock, and other railroad accessories were also sold.

In addition to the railway, considerable sales were made of surplus equipment and scrap during the period of high market value for such materials.

Boise power plant.—The hydroelectric plant at Boise Diversion Dam having served its principal purpose for the construction of Arrowrock Dam was leased to the Idaho Power Co. for a period of five years, beginning July 1, 1916, for an annual rental of $11,000. All costs of operation and maintenance are borne by the lessee, and reservation of electric power is held at cost of production for use in drainage and other work on the project.

Lateral system.—Construction of the project distribution system was continued on a considerable scale by replacement of timber structures with permanent structures of concrete or stone masonry. During the fiscal year this work included 698 drops, checks, and weirs in laterals; 12,539 linear feet of concrete V chutes; 2,350 linear feet

of concrete lining in the Waldvogel Canal upon a dangerous side hill; 4,500 linear feet of concrete lining in the Deer Flat low line through bad ground on the Snake River slope for the prevention of seepage and erosion; and large amounts of gravel or stone riprapping on the slopes of the Main, Mora, and other principal canals.

Earthwork construction was chiefly in wasteways and in small lateral extensions for covering new lands coming first under irrigation in 1917.

Ten concrete and masonry canal turnouts were placed and approximately 750 timber structures, consisting mainly of farm tap boxes and weirs.

SEEPAGE AND DRAINAGE.

The approximate area of seeped land is tabulated below, based on a water plane of from zero to 6 feet below ground surface. In general there has been a gradual extension of such areas during the year. These lands are not wholly unproductive, but among them are a few areas that have become seriously affected by seepage during the year.

Name of area.	Acreage reclaimed previously.	Acreage reclaimed 1917.	Estimated acreage still seeped.
Pioneer irrigation district	10,500		
Nampa and Meridian irrigation district	4,600	1,600	
Fargo Basin	700		550
Arena Basin			350
Ten Mile			500
Greenleaf			300
Frohman			100
Miscellaneous			250
Total	15,800	1,600	2,050

In conjunction with the project drainage a cooperative survey was made for the Riverside irrigation district, contiguous to the project, to ascertain the interrelation between and necessity of cooperative construction for the two districts. The expense of surveys was divided equally between the parties.

Construction of drains under contract with the Pioneer irrigation district was completed and similar construction under contract with the Nampa and Meridian irrigation district was completed as to the main excavation and principal structures, but a small amount of small structure work was carried over to the fiscal year 1918.

Four electric drag-line excavators were operated practically continuously up to April 15, 1917, excavating during the fiscal year 1917 a total of 1,632,439 cubic yards. These machines were operated for three 8-hour shifts per day, and their output is recorded below:

	Fiscal year 1917.		Prior to fiscal year 1917.		Total.	
	Miles.	Yardage.	Miles.	Yardage.	Miles.	Yardage.
Pioneer irrigation district			68.8	2,527,188	68.8	2,527,188
Pioneer and Nampa and Meridian cooperative work	3.6	217,348	6.9	392,258	10.5	609,606
Nampa and Meridian irrigation district	29.5	1,415,091	14.2	602,456	43.7	2,017,547
Fargo Basin			5.6	275,644	5.6	275,644
Drain from reservoir			4.1	103,017	4.1	103,017
Total	33.1	1,632,439	99.6	3,900,563	132.7	5,533,002

ECONOMIES OF GOVERNMENT WORK.

Drainage construction (operation of excavators).—The excavation of 2,142,080 cubic yards of earth during the calendar year 1916 was accomplished with four class 9½ Bucyrus electric drag-line excavators, electric power being furnished at cost of about thirty-five one-hundredths cent per killowatt hour from the Reclamation Service power plant. These machines rendered excellent service and some noteworthy excavation records were made.

The drains constructed were all open-channel cuts varying from 7 to 12 feet in depth, with side slopes of 1½ to 1 and 2 to 1, and with usual base width of from 5 to 10 feet.

The drag-line excavators were operated three 8-hour shifts per day with crews of one operator and one oiler. The material excavated consisted principally of clay, loam, soil, and bowlder gravel laid in clay and sand. This latter material constituted about 40 per cent of the total excavation and wore out bucket parts very rapidly. Temporary three-phase electric transmission lines for operating the excavators were erected at a labor cost of about $85 per mile and torn down at a cost of $20 per mile, the line materials being used repeatedly along successive drains. The following table gives costs from January 1 to December 31, 1916:

Cost of excavating.

FOUR BUCYRUS, CLASS 9½, DRAG LINES.

Classification.	Total cost.	Unit cost per cubic yard.
Operation	$20,529.88	$0.0077
Power	15,661.15	.0059
Repairs	33,650.11	.0126
Moving up	3,943.89	.0015
Cutting side drains	4,984.68	.0019
Finishing (hand labor)	629.37	.0002
Drilling and blasting [1]	217.34	.0001
Moving to new work	1,923.00	.0007
Subtotal	81,539.42	.0306
Project general expense	4,468.96	.0017
Depreciation excavation equipment	31,943.96	.0120
Depreciation temporary power system	29,351.11	.0110
Total cost	147,302.99	.0554
Total yardage	2,669,465	
Total mileage	54.17	
Cost per mile	$2,719.27	

[1] For excavation of 2,385 cubic yards of rock.

The average digging rate of the four machines was 150 cubic yards per hour or at the rate of two cycles per minute with 1½ cubic yard capacity buckets. The following table shows the machine efficiency:

Machine efficiency of four drag lines.

	Total hours.	Per cent.
Digging	17,732.50	76.9
Repairs	2,729.75	11.8
Moving	1,486.00	6.5
Blasting	64.75	0.3
Side drains and runways	591.75	2.6
Power off	430.25	1.9
Total	23,035.00	100.00

Summary of yardage.

Cubic yards excavated.	Shifts dug.	Average cubic yards per shift.	Average cubic yards per hour.	Highest run per shift (cubic yards).
2,660,465	2,824	940	150	1,967

BOARD MEETINGS.

Date.	Topic.	Personnel.
July 13, 1916	Boise project	A. P. Davis, F. E. Weymouth, B. E. Stoutemyer, and D. W. Cole.
Oct. 17, 1916	Project extensions and public announcement.	F. E. Weymouth, D. C. Henny, A. J. Wiley, and D. W. Cole.
Oct. 23, 1916	Appraisal of Arrowrock Railroad	Gen. W. L. Marshall, C. H. Swigart, and A. J. Wiley.
Jan. 15–17, 1917	Operation and maintenance conference.	I. D. O'Donnell and management of Pacific Division of United States Reclamation Service.
Jan. 18–20, 1917	Idaho Operating Engineers' Conference.	Reclamation engineers and operators; directors and operators of private companies and districts.
Mar. 30, 1917	Cost keeping and accounting	James Munn, C. C. Fisher, and Boise project clerks.
Apr. 6, 1917	Drainage of Riverside Irrigation District.	F. E. Weymouth, D. C. Henny, D. W. Cole, B. E. Stoutemyer, and J. L. Burkholder.

OPERATION AND MAINTENANCE.

Water was delivered to lands under the project on a rental basis at the rate of 40 cents per acre-foot prior to August 1, 1916, and at the rate of 60 cents per acre-foot on and after that date or for flood and storage waters respectively. The revenues from this source amounted to approximately $132,422 and resulted from a delivery of 360,681 acre-feet of water to 2,397 farms, containing an irrigable area of 101,315 acres. The average amount of water used was 3.56 acre-feet, at an average cost of $1.31 per acre for cost of operation and maintenance.

Under contract with the New York Canal Co. (Ltd.) 21,498 acres of land, comprising 405 farms, were watered through the Reclamation Service canal system with water derived from the vested right of that company.

The reservoirs of the Idaho-Iowa Lateral & Reservoir Co. were filled under contract through the Government canal system.

Under permanent contracts with the Nampa & Meridian Irrigation District and the Pioneer Irrigation District water was released for the first time from Arrowrock Reservoir to supplement the vested rights of these districts. Under temporary contracts storage water was released from Arrowrock Reservoir for the Farmers' Union Canal Co. and the New York Canal Co. to supplement their vested rights.

The right of the United States to divert water from the natural flow of the Boise River terminated for the season of 1916 on July 20, after which it was necessary to draw from Arrowrock Reservoir to maintain the necessary discharge in the main canal.

The full storage capacity of Arrowrock Reservoir (280,000 acre-feet) was available for the season, and 197,431 acre-feet of water were delivered from it. The maximum storage for Deer Flat Reservoir was 85,250 acre-feet, and the total storage for the season was 141,865 acre-

feet. There was a marked reduction in the seepage and evaporation loss, owing to the fact that the reservoir was operated on a definite schedule, carrying no great surplus storage over irrigation requirements. The loss for the season was 15.2 per cent. Of the total 101,315 acres irrigated, 32,242 were watered from Deer Flat Reservoir.

Maintenance.—The usual maintenance work, consisting of the cleaning of canals and laterals and the repairing and replacement of timber structures, was carried on, although this work was somewhat hampered by an early and long winter and by the scarcity of men and teams in the spring of 1917. Considerable riprapping with stone was done on the Mora Canal and on the lower section of the main canal during the year.

The spring of 1917 was unprecedented from the standpoint of canal breaks and other difficulties of canal operation. There was one serious break in the lower section of the main canal and several breaks occurred in the Mora, Waldvogel, and Deer Flat Lowline Canals, necessitating the turning out of water for repairs. Early in June, 1917, a dangerous leak in the lined section of the main canal just below the diversion gates from the Boise River required a shutting down of the water and the building of a concrete core wall 150 feet long in the bank between the canal and the river. It required about two weeks to make the repairs and the upper part of the project suffered a slight shortage of water during this time. The already existing troubles were further augmented by the deposition of sand in the first three-quarters of a mile of the main canal, which threatened to cut down the carrying capacity needed to keep up storage in Deer Flat Reservoir.

It is believed that many of the canal breaks were due indirectly to the running of winter stock water. The severe winter froze the wet banks to a considerable depth, which resulted in loosening up the earth and leaving large crevices near structures where water broke through when the spring water was turned on. The practice of running winter stock water is discountenanced by the project management and after the experience of last winter will probably be discontinued.

Historical review, Boise project, Idaho.

Item.	1912	1913	1914	1915	1916	1917
Acreage to which the service was prepared to furnish water	200,000	207,000	207,000	207,000	[1] 223,866	[1] 223,866
Acreage irrigated[2]	61,725	76,265	83,590	97,127	[2] 101,315	[2] 112,006
Miles of canals operated	966	969	971	973	980	982
Water delivered, acre-feet	370,056	495,470	495,665	542,102	656,854	([3])
Water delivered to land per acre of land irrigated, acre-feet	1.93	2.38	2.62	2.81	3.56	([3])

[1] Including 80,056 acres with partial vested right.
[2] Exclusive of lands in Nampa-Meridian and Pioneer irrigation districts having partial vested water rights.
[3] Not yet determined.

SETTLEMENT.

The high prices realized for farm products and live stock, together with the national policy of encouraging more extensive farming and cultivation to meet war conditions, gave considerable impetus to the clearing and cultivation of idle lands. Of the 9,000 acres of

State land advertised for sale last year, less than 3,400 acres remain unsold, and the majority of this is in small tracts. A large percentage of the land sold is being successfully farmed this year.

As a further inducement to increase farm production the Government offered for lease, with a reasonable water charge, vacant Government lands bordering the Deer Flat Reservoir, which are above the water line the greater part of the summer.

As a result of the 1916 crop season the farmers of the project realized unprecedented returns in tonnage and values, and hence enjoyed a high degree of prosperity. As a consequence there has been a notable increase in the selling price of farm lands, and a number of sales of improved farms at high prices were made during the year.

Settlement data, Boise project.

Item.	1913	1914	1915	1916	1917
Total number of farms on project	2,450	2,600	2,690	3,926	3,932
Population	7,500	8,000	8,600	12,560	13,200
Number of irrigated farms	1,575	1,771	1,908	2,450	2,600
Operated by owners or managers	1,350	1,521	1,358	1,590	1,720
Operated by tenants	225	250	550	860	880
Population	4,275	5,313	6,143	7,520	8,260
Number of towns	10	10	10	10	10
Population	30,350	30,400	30,500	34,350	34,750
Total population in towns and on farms	37,850	38,400	39,100	46,910	47,950
Number of public schools	18	20	22	22	24
Number of churches	45	50	52	52	52
Number of banks	11	11	13	15	15
Total capital stock	[1]	$1,505,000	$1,545,900	$1,750,000	$1,800,000
Total amount of deposits	[1]	$7,326,480	$8,424,300	$9,000,000	$11,500,000
Total number of depositors	[1]	27,038	[2] 23,772	24,850	[2] 25,000
Total number of relinquishments	15	10	6	18	32

[1] No record. [2] Estimated; some banks refuse to give number of depositors.

PRINCIPAL CROPS.

The principal crops grown on the project during 1916 were alfalfa, clover hay, clover seed, corn, oats, wheat, barley, and potatoes. Alfalfa covered the largest area, amounting to 26,390 acres; this was an increase over the previous year of 4,131 acres. There was a small increase for all other crops except corn and potatoes. The fruit crop of the project was practically destroyed by a heavy May freeze. Markets for all produce were well sustained, especially on grain, hay, and potatoes. Before the end of the winter hay was very scarce and was commanding a price of $25 per ton. Potatoes were selling for 5 cents a pound early in 1917. The average crop return was increased from $21.87 per acre in 1915 to $32.07 per acre in 1916. All these figures are restricted to the areas covered by the usual crop census of the Reclamation Service and do not include lands in the New York Canal tract nor in the Nampa-Meridian and Pioneer irrigation districts, to which the Government furnished water to supplement partial vested rights.

Crop report, Boise project, Idaho, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay	26,390	Tons	117,233	4.44	$7.50	$879,247	$33.32
Alfalfa seed	677	Bushels	2,018	2.98	7.25	14,631	21.61
Alsike seed	28	...do	66	2.36	10.50	693	24.75
Apples	885	Pounds	14,310	16.17	.03	429	.49
Artichokes	2	Tons	12	6.00	2.50	30	15.00
Barley	4,463	Bushels	119,900	26.87	.72	86,328	19.34
Beans	186	...do	1,712	9.20	6.00	10,272	55.23
Beets, sugar	16	Tons	87	5.44	6.00	522	32.63
Clover hay	6,694	...do	13,571	2.03	6.00	81,426	12.16
Clover seed	6,354	Bushels	22,807	3.59	9.30	212,105	33.38
Clover seed, white	27	...do	54	2.00	18.00	972	36.00
Corn, broom	1	Tons	1	1.00	125.00	125	125.00
Corn, Indian	3,055	Bushels	111,905	36.63	1.00	111,905	36.63
Corn, sorghum	38	Gallons	2,670	70.26	.40	1,068	28.11
Corn, fodder	217	Tons	1,160	5.35	2.00	2,320	10.70
Corn, pop	55	Bushels	1,920	34.91	4.50	8,640	157.09
Fruits, small	57	Pounds	54,492	956.00	.05	2,725	47.80
Garden	524					31,198	59.54
Hay, except as above	474	Tons	982	2.07	4.50	4,419	9.32
Millet seed	13	Bushels	248	19.08	1.25	310	23.85
Oats	4,440	...do	145,050	32.67	.60	87,030	19.60
Onions	1	...do	90	90.00	.84	76	75.60
Onion seed	0.5	Pounds	200	400.00	.45	90	180.00
Pasture	5,108					63,697	12.47
Peaches	128	Pounds	98,725	771.29	.05	4,936	38.56
Pears	4	...do	150	37.50	.06	9	2.25
Peas	14	Bushels	355	25.36	2.40	852	60.86
Prunes	229	Pounds	Failure.				
Potatoes, white	1,097	Bushels	161,300	147.04	.90	145,170	132.33
Potatoes, sweet	4	...do	141	35.25	3.00	423	105.75
Rye	110	...do	1,299	11.81	1.00	1,299	11.81
Wheat	17,101	...do	441,959	25.84	1.30	574,547	33.59
Less duplicated areas	5,811						
Total cropped acreage.	[1]72,581.5	Total and average				2,327,494	32.07

		Areas.	Acres.	Farms.	Per cent of project.[1]
Irrigated, no crop:		Irrigable-area farms reported	103,370.0	1,950	46.17
Young alfalfa	7,974	Irrigated-area farms reported	76,922.5	1,950	34.36
Young clover	3,595	Under water-right applications.			
Nonbearing orchard	4,100	Under rental contracts	76,922.5	1,950	34.36
Ground, fall plowed	796	Cropped-area farms reported	72,581.5	1,950	32.42
Miscellaneous	217				
Less duplicated areas	12,341				
Total irrigated acreage.	[1]76,922.5				

[1] Project percentages are figured on the basis of an irrigable area of 223,866 acres, including vested water-right lands for which crop statistics were not collected, as follows: 34,400 acres in Pioneer irrigation district, 24,158 acres in Nampa and Meridian irrigation district, and 21,498 acres covered by water of the New York Canal Co. (Ltd.), or a total of 80,056 acres. Also crop statistics were not available for collection for 42 farms of nonvested water-right lands, covering an irrigated area of 2,895½ acres.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix, p. 483.]

Feature costs of Boise project to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys:		
Distribution unit	$5,770.14	$124,730.96
Storage unit	[1] 60.75	8,720.61
	5,709.39	133,451.57
Storage system:		
Deer Flat Reservoir	.63	957,614.30
Arrowrock Reservoir	[1] 130,915.69	4,641,807.48
	[1] 130,915.06	5,599,421.78
Canal system: Main South Side Canal	6,362.13	2,031,529.41
Lateral system:		
From Main Canal	66,553.74	1,414,566.45
From Deer Flat Reservoir	71,631.67	1,178,557.77
Penitentiary lateral	730.93	24,355.93
	138,916.34	2,617,480.15
Drainage system:		
Pioneer district	8,768.60	265,956.52
Nampa-Meridian district	166,123.55	263,619.74
Cooperative	18,513.00	67,408.73
Fargo Basin	277.10	37,771.48
From Deer Flat	.....	31,796.98
Miscellaneous	3,212.56	10,500.73
	196,894.81	677,054.18
Power system	.....	195,305.27
Farm units	.....	46,899.80
Permanent improvements:		
Distribution unit	257.99	53,237.53
Storage unit	1,722.06	80,776.94
	1,980.05	134,014.47
Telephone system:		
Distribution unit	.....	34,377.50
Storage unit	.....	9,675.20
	.....	44,052.70
Operation and maintenance during construction:		
Irrigating system	173,030.26	920,946.98
Commercial power	901.24	28,441.38
	173,931.50	949,388.36
Plant accounts:		
Storage unit	[1] 3,556.81	19,304.21
Distribution unit and operation and maintenance	[1] 4,949.81	22,602.56
Drainage construction	[1] 23,672.80	16,886.18
	[1] 32,179.42	58,792.95
Gross construction cost to June 30, 1917	360,699.74	12,487,390.64
Less revenues earned during construction period:		
Rental of buildings	950.00	26,757.32
Rental of grazing and farming lands	1,979.68	14,512.29
Rentals, power and light	13,813.75	64,126.21
Rentals of irrigation water	132,201.25	510,923.24
Contractors' freight refunds	.....	13,082.53
Forfeitures by defaulting bidders and contractors	.....	24,197.92
Other revenues, unclassified	6,283.93	20,479.60
Profit on mess-house operations	.05	57,494.12
Profit on mercantile-store operations	[1] 54.11	44,945.95
Profit on hospital operations	839.98	[1] 5,408.28
Other profits on operations, unclassified	6,163.57	19,210.28
	162,178.10	790,321.18
Net cost of construction of project to June 30, 1917	.....	11,697,069.46

[1] Deduct.

Statement of cost by calendar years, Boise project.

Year ending Dec. 31—	Construction.	Operation and maintenance during construction.	Total cost.
1902	$2,274.51		$2,274.51
1903	2,965.58		2,965.58
1904	20,809.47		20,809.47
1905	19,354.12		19,354.12
1906	602,924.72		602,924.72
1907	737,141.73	$9,455.80	746,597.53
1908	823,987.25	4,973.78	828,961.03
1909	836,509.76	41,388.89	877,898.65
1910	787,274.36	64,406.52	851,680.88
1911	2,025,053.46	51,841.70	2,076,895.16
1912	1,487,290.75	84,226.36	1,571,517.11
1913	1,077,671.69	137,330.56	1,215,002.25
1914	1,877,771.80	124,397.87	2,002,169.67
1915	799,960.34	140,131.10	940,091.44
1916	409,434.31	173,033.34	582,467.65
January to June 30, 1917	2,773.14	89,761.06	86,987.92
Plant accounts to June 30, 1917	58,792.95		58,792.95
Total	11,566,443.66	920,946.98	12,487,390.64

Statement of costs by fiscal years, Boise project.

Year ending June 30—	Construction.	Operation and maintenance during construction.	Total cost.
1906[1]	$177,614.16		$177,614.16
1907	825,797.94	$4,606.26	830,404.20
1908	861,209.53	9,529.25	870,738.78
1909	775,939.73	29,898.01	805,837.74
1910	673,232.59	46,499.71	719,732.30
1911	1,226,236.26	49,059.84	1,275,296.10
1912	2,109,108.94	65,027.15	2,174,136.09
1913	1,173,559.49	117,709.90	1,291,269.39
1914	1,568,565.66	144,422.58	1,712,988.24
1915	1,526,592.81	147,643.91	1,674,236.72
1916	369,944.70	133,520.11	503,464.81
1917	187,669.48	173,030.26	360,699.74
Plant accounts to June 30, 1916	90,972.37		90,972.37
Total	11,566,443.66	920,946.98	12,487,390.64

[1] Including previous years.

Estimated cost of contemplated work, Boise project, during fiscal year 1918.

Features.	Estimated cost during fiscal year 1918.	
	Sub-feature.	Principal feature.
Examination and surveys		$800.00
Lateral system:		
Canals or laterals	$165.00	
Concrete lining	11,100.00	
Drops and chutes	2,000.00	
Wasteways	3,385.00	
Minor structures—		
Concrete	15,890.00	
Masonry	9,120.00	
Timber	8,340.00	
		50,000.00
Drainage system:		
Pioneer district	5,000.00	
Nampa-Meridian district	15,000.00	
Cooperative, Pioneer, and Nampa-Meridian	775.00	
Miscellaneous project drainage	5,000.00	
Riverside district drainage	24,225.00	
		50,000.00
Telephone system		2,000.00
Operation and maintenance under public notice:		
Operation	92,000.00	
Maintenance	108,000.00	
		200,000.00
Stores and other operations		11,000.00
Plant and equipment		3,000.00
Total		316,800.00

IDAHO, MINIDOKA PROJECT.

BARRY DIBBLE, project manager, Burley, Idaho.

LOCATION.

Counties: Minidoka and Cassia, Idaho; Jackson Lake Reservoir, Uinta, Wyo.

Townships: 8 to 11 S., Rs. 22 to 25 E., Boise meridian; Jackson Lake Reservoir, Tps. 44 to 46 N., Rs. 114 to 116 W., sixth principal meridian, Wyoming.

Railroads: Oregon Short Line; Salt Lake and Idaho.

Railroad stations and estimated population January 1, 1917: Rupert, 1,500; Heyburn, 300; Burley, 2,500; Ashton, 600; Paul, 200; Marshfield, 100; Minidoka, 150; and Acequia, 50.

WATER SUPPLY.

Source of water supply: Snake River, supplemented by storage.

Area of drainage basin: 22,600 square miles above diversion dam.

Annual run-off in acre-feet of Snake River at Montgomery's and Howell's Ferries and Neeley (16,000 square miles), 1896 to 1916; Maximum, 8,230,000; minimum, 3,827,000; mean, 6,275,000. South Fork of Snake River at Moran, Wyo. (980 square miles), 1904 to 1916: Maximum, 1,530,000; minimum, 727,410; mean, 1,125,300.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service is prepared to supply water, season of 1917, 120,852 acres.

Area under water-right applications and rental contracts, season of 1917, 116,394 acres.

Length of irrigating season: From April 1 to October 31, 214 days.

Average elevation of irrigable area: 4,225 feet above sea level.

Rainfall on irrigable area: 11¾ years, average 12.59 inches; 1916, 13.52 inches.

Range of temperature on irrigable area: −15° to 100° F.

Character of soil of irrigable area: On north side of river, sand and sandy loam predominate; about one-third of the area is clay loam. On south side of river, the soil is a disintegrated lava ash.

Principal products: Alfalfa, grasses, rye, wheat, oats, sugar beets, potatoes, fruits.

Principal markets: Pocatello, Idaho; Salt Lake, Utah; Butte and Helena, Mont.

LANDS OPENED FOR IRRIGATION.

Dates of public notices and orders relating thereto (gravity unit): Public notices—March 9, 1907; November 23, 1908; February 11, March 30, 1909; February 7, March 22, June 10, October 13, November 3 and 25, 1910; January 23, December 30, 1911; March 21, 1912; June 23, 1913; September 24, 1914; February 27, March 20, 1915; March 4, May 4, May 27, June 10, June 22, October 2, November 22, 1916; March 26, 1917. Orders—July 19, December 10, 1907; July 9, 1908; December 27, 1910; March 18 and 31, May 4, June 8, 1911; February 26, March 19 and 25, July 21, 1913; January 19, March 26 and 31, 1914; March 8, 1915; April 7, June 26, 1916. (South side pumping unit): Public notices—November 3, 1915; May 25, 1916; April 10, 1917. Orders—March 24, 1911; March 19, May 13, October 10, 1912; March 25, 1913; March 23, 1914; March 1, 1915.

Location of lands opened: Tps. 8 to 11 S., Rs. 22 to 25 E., Boise meridian.

Present status of irrigable lands opened: 95,415 acres entered subject to the reclamation act, of which 65,152 acres are on the gravity unit and 30,263 acres on the pumping unit, 1,024 acres open to entry on the gravity unit; 21,062 acres of State land, being 5,461 acres on the gravity unit and 15,601 acres on the pumping unit; 3,351 acres of private land, of which 250 acres are on the gravity unit and 3,101 acres on the pumping unit.

Annual operation and maintenance charge is based on the amount of water used. For 1917 the gravity unit, which is under the control of the settlers, has been divided into seven zones in which from 2 to 8 acre-feet of water are allowed for the minimum price which has not yet been fixed. On the pumping unit, the rate is 45 cents per

acre-foot for water used prior to June 5, and 90 cents per acre-foot for all water thereafter with a minimum of $1.25 per acre whether water is used or not. No lands are operated on a rental basis.

CHRONOLOGICAL SUMMARY.

First surveys with reference to storage possibilities in 1902.
Reconnoissance and preliminary surveys for main project begun March, 1903.
Construction recommended by board of engineers March 21, 1904.
Construction authorized by Secretary April 23, 1904.
Minidoka Dam completed September, 1906.
Temporary dam on the Moran site, Jackson Lake, completed in 1907.
First irrigation by Reclamation Service season of 1907.
Jackson Lake Dam completed November 25, 1911.
Contract for enlargement of Jackson Lake Reservoir entered into February 25, 1913.
Enlargement of Jackson Lake reservoir completed December, 1916.
Gravity unit, 99 per cent completed June 30, 1917, including drainage.
South side pumping unit, 97 per cent completed June 30, 1917.
Commercial unit, 76 per cent completed June 30, 1917.
Entire project, 98.2 per cent completed June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the Minidoka project provides for the diversion of the waters of the Snake River by a combined storage, diversion, and power dam about 6 miles south of Minidoka, Idaho, into two canal systems, one on either side of the river, watering lands in the vicinity of Acequia, Rupert, Heyburn, and Burley, Idaho. Power developed at the dam is utilized primarily for pumping water from the canals to irrigate high lands, but also for pumping for drainage purposes and for furnishing heat, light, and current for commercial use to the towns on the project and the farms adjacent to them. The United States claims all waste, seepage, spring, and percolating water arising within the project, and proposes to use such water in connection therewith. Storage for the project is provided mainly by a reservoir constructed in the upper drainage basin of Snake River, at Jackson Lake, Wyo. This is supplemented by the reservoir formed by the Minidoka Dam and known as Lake Walcott. Jackson Lake Dam, as originally planned, and Minidoka Dam are completed. Jackson Lake Dam has been raised 17 feet, making the capacity of the reservoir 790,000 acre-feet. The irrigation system for the gravity unit and the south side pumping unit and the drainage system for the gravity canals are under construction.

SUMMARY OF GENERAL DATA FOR MINIDOKA PROJECT, TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is completed		120,852
Public land entered to end of fiscal year	95,415	
Public land open to entry at end of fiscal year	1,024	
State land	21,062	
Private land	3,351	
Acreage service could have supplied season of 1916		120,300
Addition in fiscal year 1917		552
Estimated acreage service can supply July 1, 1918		120,852
Acreage actually irrigated, season of 1916		89 900
Acreage cropped under irrigation, season of 1916		81,362
Crops:		
Value of irrigated crops, season of 1916		$2,800,433.00
Value of irrigated crops, per acre cropped		$34.42
Finances:		
Gross construction cost to end of fiscal year		$5,785,028.90
Per cent complete at end of fiscal year (except extensions)		98.2
Appropriated for fiscal year 1918, total		$222,000.00
Allotment for construction, fiscal year 1918		$107,500.00
Estimated per cent complete, June 30, 1918 (except extensions)		100
Proposed appropriations, fiscal year 1919, for construction		$455,000.00
Estimated gross construction expenditures to June 30, 1919		$6,347,528.90
Estimated per cent complete, June 30, 1919 (except extensions)		100
Announced construction charges per acre. $22, $30, $40, $42, $52, $56.50, $57.50		

Finances—Continued.		
Appropriation, fiscal year 1917		[1] $454,200.55
Expenditures during fiscal year, chargeable to 1917 appropriation—		
Disbursements	$152,349.25	
Transfers	10,319.60	
	$162,668.85	
Registered liabilities chargeable to 1917 appropriation	30,951.24	
		193,620.09
Unencumbered balance, July 1, 1917		260,580.46
Repayments:		
Construction charges—		
Accrued to end of fiscal year		688,858.66
Collected to end of fiscal year		677,038.92
Uncollected at end of fiscal year		11,819.74
Operation and maintenance charges (public notice)—		
Accrued to end of fiscal year		469,051.03
Collected to end of fiscal year		393,407.63
Uncollected at end of fiscal year		75,643.40
Water-rental charges—		
Accrued to end of fiscal year		217,390.28
Collected to end of fiscal year		160,704.85
Uncollected at end of fiscal year		56,685.43
Power earnings—		
Accrued to end of fiscal year		127,995.93
Collected to end of fiscal year		120,605.67
Uncollected at end of fiscal year		7,390.26
Drainage:		
Estimated acreage damaged by seepage to end of fiscal year		543
Miles of open drains built to end of fiscal year		109
Estimated acreage protected by drains built to end of fiscal year		30,000
Estimated acreage to be protected by authorized system		30,000
Cost of drainage works to end of fiscal year		$749,333.40

CONSTRUCTION DURING FISCAL YEAR.

On April 4, 1917, the following order was approved by the Commission:

ORDER.

Regulations heretofore issued in connection with the Minidoka project provide that the United States may, subject to certain restrictions, give aid to waters users on the said project either by the sale of material and supplies at less than the actual cost thereof to the United States, by building small irrigation structures, canals, or other works for the use and benefit of said water users, or by giving credit for construction work done in delivering water to their lands and in the building of small pumping plants.

Construction charges have been heretofore announced for the said project based on the cost of the construction thereof, which cost of construction has been or would be affected by the items mentioned in paragraph 1.

It is now deemed advisable that, in order that the actual cost of construction shall not exceed the estimated amount thereof, the provisions mentioned in paragraph 1 shall be abolished after the date hereinafter mentioned.

[1] Includes refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

It is therefore hereby ordered that any entryman or water user desiring to take advantage of the provisions of the regulations referred to in paragraph 1 shall, before the 1st day of July, 1917, make written application therefor to the project manager of the said project, specifying in detail the material he wishes to purchase, the laterals, structures, or other works he wishes built by the United States, or the credit he wishes granted to his lands, and unless such written application is so made prior to the 1st day of July, 1917, as herein provided, and unless the work to be done by the applicant is diligently carried out and promptly completed, the right of any such water user or entryman to take advantage of the privileges hereinbefore described shall thereupon be terminated.

It is further ordered that in passing upon such applications as may be received the project manager shall approve no construction not authorized by existing regulations and shall in no event exceed the approved estimates for the completion of the project or the funds available for this work.

Hereafter when any entryman or owner shall by his own effort and expense, by leveling, grading, pumping, draining, or other means, render any high or waste land on his farm unit available for irrigation, water will be furnished therefor at the rates and terms provided in the public notices then effective, if, after written application by the entryman or owner on a form provided for that purpose, the project manager finds that the delivery of water is feasible and that a sufficient supply is available, subject also to approval of revised farm unit plats by director of the Reclamation Service.

The purpose of the order was to bring to a conclusion as rapidly as possible all construction work on the project.

Gravity canal system.—Altogether 166 structures were erected, of which 11 were concrete and 155 were wood. These included turnouts, drops, checks, measuring devices, and similar structures.

South side pumping canal system.—On the pumping unit, conconstruction was largely completed in compliance with the above order. There were 179 structures built, of which 44 were concrete and 135 were wood. New laterals constructed amounted to 1.33 miles.

Commercial power.—The use of electricity for commercial purposes continued to increase steadily. At Rupert the new hotel building was equipped with a steam heating system using 300 kilowatts for generating the steam. The demand at Burley had grown so large that three new 400-kilowatt transformers were installed in the substation to care for the load. A new high-tension transmission line was built from near Boersch Lake Pumping Station to Paul to take care of the sugar factory's demands. Plans were made for a permanent substation at this point to replace the temporary structure now in use. Contracts were made with the Unity Light & Power Co., composed of some 50 farmers east of Burley, to use 10 kilowatts of power, and with the Rural Electric Co., a similar organization near Rupert, which agreed to take 5 kilowatts. A number of other small companies are negotiating for electricity. A copper and lead mine situated 9 miles south of Albion is figuring on getting a large supply of power. At Burley, the new 5-story flouring mill and the new brick plant are equipped for operation by electric power. The revenue from commercial power during the past fiscal year amounted to about $40,000, and is rapidly increasing.

Drainage.—The main drain was completed by means of the floating dredge, which was afterwards stored at Heyburn. A few short drains for the relief of isolated tracts of land were constructed by individuals or were contemplated.

SEEPAGE AND DRAINAGE.

The drainage system has been in operation long enough to determine fairly definitely its effects on the project. There is little question that the system has, in a large degree, accomplished its purpose of reclaiming the seeped land. Indeed, there has been some complaint that the land has been drained too much, thus requiring more irrigation than was formerly necessary. On the whole, however, the project has been vastly improved by the drainage system which has justified its cost. During 1916, the system discharged 93,983 acre-feet of water, exclusive of that carried by the D9 drain. This is an increase of nearly 14,000 acre-feet over 1915.

OPERATION AND MAINTENANCE.

The most noteworthy event during the year was the transfer of the gravity unit to the settlers for operation which took place January 1, 1917. This move had been advocated for several years by a number of the settlers, and in furtherance of it an irrigation district had been organized. A form of contract was submitted to the people at an election held August 1, 1916, the terms of which were approved by a vote of 527 to 137. On December 2, 1916, the contract was formally signed by the Secretary of the Interior, and on the 1st day of the year the canals and laterals were turned over to the district for future operation. The district was also given possession of the office building at Rupert and of the telephone lines on the gravity unit of the project.

During the fall of 1916 a large force of men and teams were put to work cleaning out the canals so that they would be in as good condition as possible for turning over to the district. This work was carried on as long as the weather would permit, and was completed by the district in the spring of 1917. Spring work was greatly delayed by unusually cold weather and heavy snows and the opening of the irrigation season was correspondingly delayed. Water was turned into the main north side canal on April 25, and the main south side canal on May 19. The operation of the south side pumping stations was begun May 22.

There were no serious breaks in the canals during the year, and the power house and pumping stations were operated practically without interruption.

Historical review, Minidoka project.

Item.	1912	1913	1914	1915	1916	1917
Acreage for which service was prepared to supply water	112,000	116,600	117,000	120,000	120,300	120,852
Acreage irrigated	70,200	76,000	81,500	83,562	89,900	1 100,000
Miles of canal operated	382	457	520	590	615	620
Water diverted (acre-feet)	440,200	489,200	604,000	609,434	640,432	.....
Water delivered to land (acre-feet)	304,172	383,000	353,000	323,479	334,649	.....
Per acre of land irrigated (acre-feet)	4.3	5.0	4.3	3.9	3.7	.....

[1] Estimated.

SETTLEMENT.

The prosperous conditions that prevailed during 1915 were continued throughout 1916. They were due, however, to the high prices rather than to the size of crops which were not above the average. The prospects for 1917 are excellent, both in regard to yield and prices of crops.

The population continues to increase. That of the towns in 1916 was estimated at 4,500 and of the farms at 6,628.

There was much building activity on the project, the most notable example being the new sugar factory near Paul. This will be a thoroughly modern plant, with a normal capacity of about 800 tons per day. It is expected to be ready for use in the fall of 1917. At Burley a 5-story, modern reinforced-concrete flouring mill, with capacity of 400 barrels per day and a pressed brick plant, with daily capacity of 40,000 bricks, were completed and put in operation. Many new business blocks and residences are under construction. At Rupert a sewerage system to cover the entire town is being built. Bank deposits on the project increased from $1,311,641 in 1916 to $2,522,764 in 1917. There was also a gain in depositors from 6,370 to 7,350.

A sale of town lots and acreage tracts was held at Acequia on November 24. There were 70 tracts offered and all were sold, most of them above the appraised price. On May 21, 1917, a sale of State lands in Minidoka County was held at Rupert, and on May 23 a similar sale was held at Burley of the lands in Cassia County. All of the remaining State lands on the project, about 2,100 acres, were offered for sale, and all but about 500 acres were disposed of at prices ranging from $10 to $52 per acre. In addition, most of the lots in the two State additions to Heyburn were sold.

Many sales of farm lands have been made at prices ranging from $100 to $200 per acre.

Settlement data, Minidoka project.

Item.	1913	1914	1915	1916	1917
Total number of farms on project	2,092	2,113	2,164	2,322	2,327
Population	4,800	5,200	5,800	6,468	6,628
Number of irrigated farms	1,708	1,741	1,713	1,760	1,938
Operated by owners or managers	1,496	1,525	1,402	1,352	1,413
Operated by tenants	212	216	311	408	525
Population	4,800	5,200	5,800	5,800	6,628
Number of towns	5	5	5	5	6
Population	2,200	3,000	3,500	4,100	4,500
Total population of towns and farms	7,000	8,200	9,300	10,568	11,128
Number of public schools	20	21	21	21	21
Number of churches	11	13	21	21	25
Number of banks	6	6	6	6	6
Total capital stock	$97,500.00	$137,500.00	$140,000.00	$140,000.00	$165,000.00
Total amount of deposits	$547,234.84	$677,007.18	$821,909.28	$1,311,641.00	$2,522,764.00
Total number of depositors	2,954	4,119	4,721	6,370	7,350

PRINCIPAL CROPS.

The value of crops grown in 1916 was the highest in the history of the project. The average yield per acre was $34.42, more than 50 per cent higher than in 1915. The yield on the gravity unit was $34.78 and on the pumping unit $34 per acre. Of the principal

crops, potatoes had the highest value per acre, amounting to nearly $147. Sugar beets followed with an average value of $64 per acre. Alfalfa remained the most valuable crop, producing nearly 45 per cent of the total yield of the project. In total value potatoes, sugar beets, and wheat followed in the order named.

Crop report, gravity unit, Minidoka project, Idaho, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay	22,026	Ton	77,445	3.5	$9.95	$770,264	$34.88
Alfalfa seed	570	Bushel	2,689	4.7	5.99	16,131	28.30
Apples	130	Pound					
Barley	1,650	Bushel	46,699	28.3	.85	39,750	24.09
Beans	35	do	499	14.3	3.07	1,532	43.77
Beets, sugar	3,225	Ton	37,706	11.7	5.75	216,644	67.17
Beet seed, sugar	40	Pound	40,000	1,000	.15	6,000	150.00
Clover hay	547	Ton	1,643	3	9.37	16,397	29.98
Clover seed	511	Bushel	2,652	5.2	8.37	22,206	43.46
Corn	86	do	2,295	26.7	1.00	2,305	26.80
Corn fodder	21	Ton	41	2	6.00	246	11.71
Fruits, small	23	Pound	4,315	18.8	.12	522	22.70
Garden	464					24,541	52.89
Mangels	111	Ton	1,534	13.8	5.13	7,870	70.90
Millet seed	10	Pound	14,680	1,468	.028	408	40.80
Mixed hay	304	Ton	518	1.7	8.99	4,656	15.31
Oats	3,718	Bushel	103,164	27.7	.60	62,076	16.70
Onions	20	do	1,902	95.1	1.25	2,378	118.90
Pasture	4,845					56,791	11.72
Peas	200	Bushel	5,125	25.6	1.86	9,545	47.72
Potatoes	1,283	do	203,990	159	.90	183,480	143.01
Rye	109	do	1,275	11.7	1.20	1,530	14.03
Wheat	3,687	do	85,608	23.22	1.14	97,606	26.47
Miscellaneous	750						
Total cropped acreage	44,365	Total and average				1,542,878	34.78

		Areas.	Acres.	No. Farms.	Per cent of project.
Irrigated, no crop:					
Nonbearing orchard	840	Total irrigable area farms reported	67,293	1,252	93
Young alfalfa	4,504	Total irrigated area farms reported	49,257	1,252	68
Fall plowing	813	Under water right applications	49,209	1,250	
Miscellaneous	557	Under rental contracts	48	2	
Less duplicated areas	1,822	Total cropped area farms reported	44,365	1,252	60
Total irrigated acreage	49,257				

Crop report, South Side pumping unit, Minidoka project, Idaho, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa	15,278	Ton	47,811	3.1	10.00	$478,110	$31.29
Alfalfa seed	184	Bushel	810	4.4	6.00	4,860	26.41
Barley	965	do	24,413	25.3	.85	20,751	21.50
Beans	11	do	102	9.3	3.00	306	27.82
Beets	3,135	Ton	33,248	10.6	5.75	191,176	60.98
Clover	333	do	815	2.4	10.00	8,150	24.47
Clover seed	1,191	Bushel	5,017	4.2	9.00	45,153	37.91
Corn	34	do	415	12.2	1.00	415	12.41
Corn fodder	11	Ton	33	3	6.00	198	18.00
Garden	383					12,903	33.69
Hay (mixed)	102	Ton	178	1.8	15.00	2,670	26.17
Oats	2,547	Bushel	66,697	26.2	.60	40,018	15.71
Pasture	3,821					44,713	11.70
Peas	185	Bushel	2,828	15.3	1.80	5,091	27.51
Potatoes	1,544	do	256,713	166	.90	231,042	149.64
Rye	16	do	87	5.4	1.20	104	6.52
Wheat	7,341	do	143,246	19.6	1.20	171,895	23.42
Less duplicated areas	84						
Total cropped acreage	36,997	Total and average				1,257,555	34.00

Crop report, South Side pumping unit, Minidoka project, Idaho, year of 1916—Contd.

	Area (acres).	Areas.	Acres.	Number of farms.	Per cent of project.
Irrigated, no crop:		Total irrigable area farms reported..	42,688	686	87
Orchard	333	Total irrigated area farms reported..	40,643	686	83
Young alfalfa	1,340	Under water right applications.	40,643	686	83
Young clover	892	Total cropped area farms reported...	36,997	686	75
Fall plowed	432				
Miscellaneous	1,379				
Less duplicated areas...	730				
Total irrigated acreage..	40,643				

PUBLIC NOTICES AND ORDERS.

PUBLIC NOTICE, OCTOBER 2, 1916.

1. In accordance with the provisions of the act of Congress of June 17, 1902 (32 Stat., 388), known as the reclamation act, and acts amendatory thereof and supplementary thereto, and particularly the reclamation extension act of August 13, 1914 (38 Stat., 686), public notice is hereby given that the cost of the drainage system of the north side portion of the gravity unit of the Minidoka project shall be paid as follows:

2. The cost of the drainage works shall be apportioned at the rate of $12 per acre to the irrigable area, as heretofore or hereafter announced or fixed, of all lands under the Minidoka project on the north side of Snake River.

3. Said cost of $12 per irrigable acre shall be paid as follows:

(*a*) For land the entrymen or owners of which have not accepted or do not accept the reclamation extension act, the drainage cost of $12 per irrigable acre shall be paid or continue to be paid in connection with and as a part of operation and maintenance charge, in accordance with the terms of public notices and orders previously issued until the entire drainage cost of $12 per irrigable acre is paid.

(*b*) For land subject to the reclamation extension act agreements have been made with the majority of the water-right applicants and entrymen affected consenting to an increase of construction charges, and for such land there shall be added to the construction charge the drainage cost of $12 per irrigable acre less the amount, if any, of any payments heretofore made on account of drainage and less also the amount, if any, heretofore added to the construction charge on account of drainage. Payment of said increased construction charge shall be made at the same time and in the same number of installments and, except for the last installment, shall be the same percentage of the increased construction charge as installments of the construction charge to be paid after the date of this notice. The last installment of the increased construction charge shall be sufficient in amount to pay all of the increased construction charges not theretofore payable.

(*c*) For lands for which a homestead entry or water-right application is hereafter filed the drainage cost (less the amount, if any, heretofore added to or included in the construction charge on account of drainage) shall be added to the construction charge applicable thereto under public notices or orders heretofore issued.

4. In the operation and maintenance of the drainage system of the project, repairs and the removal of obstructions are at times necessitated through damage caused by accident or negligence or design on the part of the water user. In order that such damages may be promptly repaired and the cost equitably apportioned, it is hereby ordered that if, after written notice from the project manager or proper officer of the district organization to the person responsible for the damage, such repairs are not promptly and properly effected or obstruction removed, then the United States or its successor in charge of the project will supply the necessary labor, material, and supplies for such work and the charges shall be equitably apportioned against the lands owned by the person or persons responsible for such damage. Such charges shall become due on March 1 of the next year after the repairs have been made, and no tract against which such charges may have become due will be entitled to water until the same shall have been paid.

BO SWEENEY,
Assistant Secretary of the Interior.

PUBLIC NOTICE, NOVEMBER 22, 1916.

1. In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplemental thereto, and particularly the reclamation extension act of August 13, 1914 (38 Stat., 686), public notice for certain lands in the Minidoka project, Idaho, is hereby issued as follows:

2. *Lands for which water will be furnished.*—Water will be furnished under said project in the irrigation season of 1917, and thereafter, for the irrigable lands in lots 1 and 2, sec. 1, T. 9 S., R. 23 E., Boise meridian, the same being farm unit G of said section. An amended farm unit plat of said township and range showing said farm unit G was approved by the Acting Director of the United States Reclamation Service, August 30, 1916, and is on file at the local land office at Hailey, Idaho, and in the office of the project manager, at Rupert, Idaho.

3. *Water-right application.*—Water-right application for this land must be made to the project manager United States Reclamation Service, Rupert, Idaho, upon a form provided for that purpose, and may be made at any time on or after date of this notice. It must be for the entire irrigable area of said farm unit, and be accompanied by the proper initial water-right payment, which will be accepted by the project manager, in the form of New York draft or money order payable to special fiscal agent, United States Reclamation Service, Rupert, Idaho, or in currency.

4. *Classes of charges for water right.*—The water-right charges are of two kinds, to wit: (*a*) A charge against each irrigable acre to cover cost of construction of the irrigation system, including drainage as heretofore announced by public notice of October 2, 1916; and (*b*) an annual charge against each irrigable acre to cover cost of operation and maintenance of the system.

5. *Construction charge.*—The construction charge shall be $42 (original construction charge of $30 plus drainage cost of $12) per irrigable acre, payable 5 per cent or $2.10 at the time of filing water-right application, and the remainder of $39.90 in 15 annual install-

ments, the first five of which shall be 5 per cent or $2.10 each, and the remaining ten, 7 per cent, or $2.94 each. The first of said 15 annual installments shall be due and payable December 1, of the fifth calendar year after the year in which the initial installment was paid, and the subsequent installments shall be due and payable on December 1 of each calendar year for 14 years thereafter. But the whole or any part of said construction charge may be paid by the applicant within any shorter period: *Provided*, That, if water-right application for said unit be not made within one year from the date of this notice, said construction charge shall be increased 5 per cent each year until such application is made and an initial installment is paid.

6. *Operation and maintenance charge.*—The operation and maintenance charge upon said unit for the irrigation season of 1917 will be of the amount in effect for other lands of said project in the same season, and be due March 1, 1918. The specific amount of such charge will be duly announced annually and will be payable on March 1 of each year for the preceding irrigation season.

7. *Expense of tap boxes, laterals, etc.*—The United States will incur no expense in connection with the installation of tap boxes or other structures, or with the construction or enlargement of any laterals for the irrigation of said farm unit.

8. *Previous notices and orders applicable.*—Except as herein otherwise provided, the public notices and orders heretofore issued shall be effective as to said unit so far as may be applicable.

ALEXANDER T. VOGELSANG,
First Assistant Secretary.

PUBLIC NOTICE, MARCH 26, 1917.

1. In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplementary thereto, and particularly of the reclamation extension act of August 13, 1914 (38 Stat., 686), public notice for the 114 pumping extension, gravity unit, Minidoka project, Idaho, is hereby issued as follows:

2. *Lands for which water will be furnished.*—Upon proper application being made therefor, water will be furnished under said project in the irrigation season of 1917, and thereafter, for the irrigable lands in the high land areas of the said extension shown on the farm-unit plats of the following townships of the Boise Meridian, to-wit: T. 8 S., R. 24 E.; T. 9 S., R. 24 E., which plats were approved by the Secretary of the Interior on November 14, 1916, and are on file in the office of the project manager, United States Reclamation Service, Burley, Idaho, and the local land office at Hailey, Idaho.

3. *Limit of area for which water right may be secured.*—The limit of area per entry representing the acreage which, in the opinion of the Secretary of the Interior, may be reasonably required for the support of a family upon such lands, is fixed as shown upon the plats for the several farm units. The maximum limit of area for which water-right application may be made for lands in private ownership shall be 160 acres of irrigable land for each landowner.

4. *Applications for water right.*—All water-right applications must be made to the project manager, United States Reclamation Service,

Burley, Idaho, upon forms provided for that purpose, and may be made on and after the date hereof.

5. *Construction charge.*—For lands entered subject to the provisions of the reclamation law the construction charge shall be $42 per irrigable acre, and for State and deeded lands, and lands not entered subject to the reclamation law the construction charge shall be $52 per irrigable acre, payable as follows:

(*a*) For lands that were entered prior to August 13, 1914, subject to the reclamation law or prior to that date were subjected by contract, trust deed, or otherwise to the provisions of the reclamation law, said construction charge shall be paid in not more than 10 equal annual installments, the first of which shall be due and payable at the time of filing water-right application, and subsequent installments shall be due and payable December 1 of each year thereafter; provided, however, that if water-right application subject to the provisions of said reclamation extension act, or an acceptance of the provisions of same in accordance with section 14 thereof, be filed within six months after the issuance of this notice, said construction charge shall be payable in 20 annual installments, the first of which shall become due and payable on December 1 following the date of water-right application, and subsequent installments on December 1 of each year thereafter; in which event the first 4 installments shall each be 2 per cent, the next 2 installments shall each be 4 per cent, and the next 14 each 6 per cent of the total construction charge.

(*b*) For the remaining lands an initial payment of 5 per cent of the construction charge shall be made at the time of filing water-right application, and the remainder of the construction charge shall be paid in 15 annual installments, the first 5 of which shall each be 5 per cent and the remainder each 7 per cent of the total construction charge. The first of said 15 annual installments shall become due and payable December 1 of the fifth calendar year after the initial installment, and subsequent installments shall become due and payable on December 1 of each calendar year thereafter.

6. *Increased construction charge in certain cases.*—In all cases where water-right application for lands in private ownership or for lands under entries not subject to the reclamation law, shall not be made within one year after the date of this notice, the construction charge for such lands shall be increased 5 per cent each year until such application is made and an initial installment is paid.

7. *Advance payment of construction charge permissible.*—Any water-right applicant may, at his option, pay in advance the whole or any part of the construction charge owing by him within any shorter period than that prescribed by this notice.

8. *Method of payment of construction charge.*—In accordance with contract dated December 2, 1916, between the United States and the Minidoka irrigation district, the construction charges against the lands of the 114 pumping extension, gravity unit, due the United States, are payable by the water users to said Minidoka irrigation district, as fiscal agent of the United States.

9. *Operation and maintenance charges.*—Under the terms of said contract of December 2, 1916, turning over to the Minidoka irrigation district the operation and maintenance of the gravity unit, the

necessary funds therefor, including the proportionate part of the cost and operation of the works retained by the United States, will be provided by the district. In case the United States takes over the operation and maintenance of the gravity unit the operation and maintenance charges will be fixed by public notice issued by the Secretary of the Interior.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

PUBLIC NOTICE, APRIL 10, 1917.

1. *Annual operation and maintenance charges.*—In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat. 388), and of acts amendatory thereof and supplementary thereto, and particularly of the reclamation extension act of August 13, 1914 (38 Stat. 686), announcement is hereby made that the annual operation and maintenance charges for the irrigation season of 1917 and thereafter until further notice against all lands of the south side pumping unit, Minidoka project, Idaho, under public notice, shall be as follows: Forty-five cents per acre-foot for all water delivered on or before June 5 and 90 cents per acre-foot for all water delivered after June 5 and on or before October 20: *Provided, however,* That there shall be a minimum charge of $1.25 against each irrigable acre whether water is used thereon or not, which minimum charge will be applied in payment of the charges under the acre-foot rates.

2. *Optional water service.*—Until further notice, after October 20 of each season no water will be furnished except upon request, and at an additional charge for each farm unit of 80 acres or fraction thereof of $2 for each day of water service given: *Provided, however,* That every person desiring this service shall, before receiving same, deposit with the special fiscal agent of the United States Reclamation Service at Burley, Idaho, a sum of money sufficient to cover the number of days that he desires water and designates the turnout where he wishes to have the water delivered and the size of stream he will require. So far as may be practicable, water will be delivered to each depositor for the days covered by his deposit, but whenever the aggregate deposits for any day are less than $200, delivery of water will cease and will not thereafter be resumed. Any unused deposits will be returned to the persons by whom they were made. This service will not be commenced, however, unless deposits aggregating $200 per day for a reasonable period shall be made prior to October 20.

FRANKLIN K. LANE,
Secretary of the Interior.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix, p 485.]

Feature cost of Minidoka project, to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys	85.06	
Examination and preliminary		$66,587.90
Engineering		19,697.60
Use of water		4,435.34
	5.06	90,720.84
Storage system	[1] 56,437.91	
Jackson Lake Dam		417,139.06
Jackson Lake Bridge		33,263.07
	[1] 56,437.91	450,402.13
Pumping for irrigation	[1]619.84	
Temporary pumping plant		7,886.25
South side pumping stations		461,934.42
North side pumping stations		33,748.76
	[1] 619.84	503,569.43
Canal system	56,789.57	
Raising spillway, Walcott reservoir		33,975.16
Spillway gates and channel reservoir		22,377.65
Minidoka Dam and spillway		547,663.66
River protection		21,388.70
Right of way above dam		46,545.63
Main north side canal		253,445.79
Main south side canal		304,063.00
Waste canals		46,809.16
A. B. C. canals		381,567.14
Structures		87,653.72
Monarch & Porter litigation		886.95
Feeder canals		77,489.85
	56,789.57	1,823,866.41
Lateral system	14,328.00	
General force account		253,963.60
Structures		18,974.73
Purchase and rebuilding laterals		190,325.97
Measuring devices		47,098.15
High land		27,475.54
G. H. & J. laterals		520,149.82
Right of way		1,907.54
West end laterals		44,748.81
	14,328.00	1,104,644.16
Drainage system	36,858.64	749,333.40
Power system	11,698.57	
Power plant		449,094.60
Transmission lines		84,426.54
Substations		58,547.21
	11,698.57	592,068.35
Permanent improvements:		
Buildings at dam		47,892.02
Buildings at Rupert		19,516.23
Buildings at pumping stations		23,339.00
Buildings at Burley		9,172.12
Roads		1,615.02
		101,534.39

[1] Deduct.

Feature cost of Minidoka project, to June 30, 1917—Continued.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Telephone system:		
Original gravity unit		$13,799.71
South side pumping unit		14,596.30
		28,396.01
Operation and maintenance during construction	$246,678.49	330,353.90
Plant accounts	[1] 4,474.64	10,139.88
Gross construction cost to June 30, 1917	304,825.94	5,785,028.90
Less revenues earned during construction period:		
Rentals of buildings	1,776.11	8,783.68
Rentals of grazing and farming lands	763.96	1,668.41
Rentals of irrigation water		53,271.20
Contractors' freight refunds		552.39
Forfeitures by defaulting bidders and contractors		90.00
Other revenue unclassified	[1] 46.19	9,182.73
Profit on hospital operations	440.58	1,733.14
	2,934.46	75,281.55
Net cost of construction of project to June 30, 1917		5,709,747.35

[1] Deduct.

Statement of cost by calendar years, Minidoka project.

Year ending Dec. 31—	Construction.	Operation and maintenance.			Total cost.
		During construction.	Under public notice.	Total operation and maintenance.	
1903	$26,111.96				$26,111.96
1904	83,053.65				83,053.65
1905	505,805.94				505,805.94
1906	736,028.48				736,028.48
1907	439,598.02		$25,510.51	$25,510.51	465,108.53
1908	367,628.31		35,279.52	35,279.52	402,907.83
1909	731,680.54	$22,084.23	37,485.35	59,569.58	791,250.12
1910	517,542.12	57,654.75	48,043.74	105,698.49	623,240.61
1911	284,875.36	51,010.78	36,515.54	87,526.32	372,401.68
1912	183,969.35	68,250.72	41,239.03	109,489.75	293,459.10
1913	192,249.55	69,894.50	46,271.39	116,165.89	308,415.44
1914	471,258.78	107,023.28	83,874.99	190,898.27	662,157.05
1915	128,886.24	81,479.25	133,244.58	214,723.83	343,610.07
1916[1]	17,868.26	[2] 127,043.61	1,021,344.02	894,300.41	912,168.67
January to June, 1917	768,118.44		[2] 817,437.38	[2] 817,437.38	[2] 49,318.94
Total	5,454,675.00	330,353.90	691,371.29	1,021,725.19	6,476,400.19

[1] Drainage Construction transferred to Construction costs from Operation and maintenance under Public notice.
[2] Deduct.

Statement of cost by fiscal years, Minidoka project.

Year ending June 30—	Construction.	Operation and maintenance.			Total cost.
		During construction.	Under public notice.	Total operation and maintenance.	
1903	$8,849.33				$8,849.33
1904	34,525.27				34,525.27
1905	131,582.02				131,582.02
1906	880,029.87				880,029.87
1907	592,027.09				592,027.09
1908	287,168.95		$39,911.00	$39,911.00	327,079.95
1909	641,398.19		44,395.26	44,395.26	685,793.45
1910	596,840.30	$53,126.64	84,425.01	137,551.65	734,391.95
1911	404,546.60	27,529.08	138,968.90	166,497.98	571,044.58
1912	201,701.53	5,090.26	213,804.73	218,894.99	420,596.52
1913	200,588.23	[2] 1,509.88	266,003.09	264,493.21	465,081.44
1914	484,982.89	[2] 560.69	359,740.10	359,179.41	844,162.30
1915	158,725.34		316,177.13	316,177.13	474,902.47
1916	773,561.94		200,101.98	200,101.98	973,663.92
1917[1]	58,147.45	[1] 246,678.49	[2] 972,155.91	[2] 725,477.42	[2] 667,329.97
Total	5,454,675.00	330,353.90	691,371.29	1,021,725.19	6,476,400.19

[1] Drainage cost transferred from Operation and maintenance under Public notice to Construction.
[2] Deduct.

Estimated cost of contemplated work, Minidoka project, during fiscal year 1918.

Features.	Estimated cost during fiscal year 1918.	Features.	Estimated cost during fiscal year 1918.
Examination and surveys	$4,000.00	Permanent improvements	$1,000.00
Storage system	46,200.00	Operation and maintenance under Public notice	120,000.00
Pumping for irrigation	3,300.00	Stores and other operations	2,000.00
Canal system	6,000.00	Plant and equipment	6,500.00
Lateral system	25,000.00		
Drainage system	9,000.00		
Power system	11,000.00	Total	234,000.00

IDAHO-WYOMING, JACKSON LAKE ENLARGEMENT.

F. A. Banks, Engineer, Moran, Wyo.

SUMMARY OF GENERAL DATA FOR JACKSON LAKE ENLARGEMENT TO END OF FISCAL YEAR 1917.

Gross construction cost to June 30, 1917		$754,494.73
Per cent complete June 30, 1917		100
Appropriation for fiscal year 1918		None.
Allotment for fiscal year 1918		None.
Per cent complete June 30, 1918		100
Appropriation fiscal year 1917		[1] 259,554.14
Expenditures during fiscal year chargeable to 1917 appropriation:		
Disbursement	$20,862.84	
Transfers	1,823.17	
	$22,686.01	
Registered liabilities chargeable to 1917 appropriation	10,466.96	
		33,152.97
Unencumbered balance July 1, 1917		226,401.17

HISTORY OF CONSTRUCTION AND ENGINEERING FEATURES.

Jackson Lake enlargement consists of the raising and widening of the Jackson Lake Dam, which was completed in 1911, thereby permitting the raising of the water surface of the reservoir 17 feet and increasing its storage capacity from 380,000 to 789,000 acre-feet. This work was done under contract of February 25, 1913, between the United States and the Kuhn Irrigation & Canal Co. and Twin Falls Canal Co., which provides that the construction be done by the Reclamation Service with funds advanced by the above companies and that the title and control of the property remain in the United States.

The work was begun in May, 1913, and completed in December, 1916.

CONSTRUCTION DURING FISCAL YEAR.

At the beginning of the fiscal year there remained to be done about 10,000 cubic yards of embankment and 6,000 cubic yards of riprap. This work was done during July and August.

Other work done was the placing of wooden faces on the radial gates and installation of winches for their operation; construction of a substantial pipe railing on each side of the deck of the dam; installation of staff gages in the reservoir, in the tail water, and at the gaging station 2½ miles below the dam; construction of a concrete gage house and stilling well with automatic water register at the gaging station; and the installation of a new cable, car, and frame.

Construction work was practically completed in September, but cleaning up, disposal of equipment and supplies, and completing records required some time and it was December before the job was pronounced completed.

[1] Includes refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix, p. 488.]

Feature cost of Jackson Lake enlargement to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	To end of fiscal year 1917.
Storage works, Jackson Lake Reservoir:		
Preliminary and general work	$987.17	$28,095.77
Dam and spillway	39,063.55	701,084.74
Administrative general expense	2,688.71	10,318.33
	42,739.43	739,498.84
Permanent improvements:		
Buildings	334.89	973.98
Roads	131.97	11,289.07
Administrative general expense	68.06	81.62
	534.92	12,344.67
Telephone system		2,651.22
Gross construction cost to June 30, 1917	43,274.35	754,494.73
Less revenue earned during construction period:		
Rental of buildings	100.75	905.55
Forfeitures by defaulting bidders and contractors	78.00	767.65
Contractors freight refunds	479.01	479.01
Losses on hospital operations	[1] 1,994.66	[1] 168.00
	[1] 1,336.90	1,984.21
Net cost of construction to June 30, 1917		752,510.52

[1] Deduct.

KANSAS, GARDEN CITY PROJECT.

LOCATION.

Counties: Finney and Kearny.
Townships: 23 and 24 S., Rs. 32 to 34 W., sixth principal meridian.
Railroad: Atchison, Topeka & Santa Fe.
Railroad stations and estimated population January 1, 1917: Garden City, 3,500, and Deerfield, 200.

WATER SUPPLY.

Source of water supply: Shallow wells near Arkansas River, and natural flow from the river.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service is prepared to supply water, season of 1917: No water being supplied by Reclamation Service, on account of failure of water users to pay back charges.
Length of irrigating season: From April 1 to October 31—214 days.
Average elevation of irrigable area: 2,925 feet above sea level.
Rainfall on irrigable area: 19 inches, average.
Range of temperature on irrigable area: —20° to 105° F.
Character of soil of irrigable area: Fertile black sandy loam.
Principal products: Alfalfa, sugar beets, melons, sweet potatoes, small fruits.
Principal markets: Garden City, Kans.; Kansas City, Mo.; Chicago, Ill.

LANDS OPENED FOR IRRIGATION.

Dates of public notices: March 6, 1908, and November 30, 1908.
Location of lands opened: Tps. 23 and 24 S., Rs. 32, 33, and 34 W., sixth principal meridian.
Irrigable lands opened: 10,677 acres, all in private ownership.
Limit of area of farm units: 160 acres.
Duty of water: 2 acre-feet per acre per annum at the farm.
Building charge per acre of irrigable land: $37.50.
Annual operation and maintenance charge: $2.75 per acre of irrigable land.

CHRONOLOGICAL SUMMARY.

Reconnoissance made and preliminary surveys begun in 1904.
Construction recommended by board of engineers September 5, 1905.
Construction authorized by Secretary October 5, 1905.
Power plant completed July, 1907.
Conduit and siphon completed July, 1907.
First irrigation by Reclamation Service, season of 1908.
Wells completed, April, 1908.
Pumps: 10 installed in 1907, 13 installed in 1908.
Entire project 100 per cent completed June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the Garden City project provides for the utilization by pumping of the underground flow of the Arkansas River Valley to supplement the normal flow of Arkansas River distributed through the Farmers' ditch to irrigate lands northwest of Garden City, Kans.

A power house is located on the main line of the Atchison, Topeka & Santa Fe Railroad at Deerfield, Kans., for the transmission of electrical energy to 23 pumping stations, located along a concrete-lined canal 20.000 feet in length.

The pumps are connected at three of these stations to twelve 15-inch wells each, and at 20 stations to 9 wells each. All of the features of this plan are completed.

SUMMARY OF GENERAL DATA FOR GARDEN CITY PROJECT, TO END OF FISCAL YEAR 1917.

Areas:	
Irrigable acreage when project is complete	10,677
Private land	10,677
Finances:	
Gross construction cost to end of fiscal year	$385,467.57
Per cent complete at end of fiscal year	100.00
Appropriated for fiscal year 1918, total	$1,000.00
Allotment for fiscal year 1918	$500.00
Estimated gross construction expenditures to June 30, 1919	$385,967.57
Total appropriation, fiscal year 1917	[1] 2,167.42
Expenditures during fiscal year, cahrgeable to 1917 appropriation:	
Disbursements	$44.45
Unencumbered balance, July 1, 1917	$2,122.97

OPERATION AND MAINTENANCE.

Payment of the Reclamation Service charges has not been made since 1909, and inasmuch as the public notices which have been issued provide that no water shall be furnished in any irrigation season until the operation and maintenance charges of the previous season have been paid, the plant has been closed. The plant itself is not a failure, but the people will not try to make it a success. Since 1909 no water has been pumped, and maintenance work has been confined to the necessary care of the plant.

FUTURE PLANS.

In January, 1917, a complete inventory and appraisal was made of the plant and equipment of the project in preparation for the advertisement and sale or other disposal thereof.

[1] Includes refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix, p. 489.]

Feature costs of Garden City project to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys		$7,618.72
Pumping for irrigation:		
Well pits and shafts		53,489.51
Pumping plants		51,694.13
		105,183.64
Canal system:		
Temporary structures		2,497.42
Concrete conduit		56,473.73
Bridge across conduit		150.30
Concrete culvert		97.76
Arkansas River siphon		26,785.15
Right-of-way fence		2,541.81
		88,546.17
Power system	[1] $137.61	
Power-house building and plant		81,666.37
Electrical installation		15,410.75
Soft water well No. 1		1,219.37
Coal scales, trestle, and coal bins		5,445.08
Industrial and railroad track		1,556.30
Circulating 12-foot well		13,890.00
Soft water well No. 2		1,073.71
Soft water well No. 3		1,543.73
Cooling tower		1,710.24
Board of survey expense		474.14
	[1] 137.61	123,983.69
Farm units		285.66
Permanent improvements:		
Real estate		1,349.23
Headquarters buildings		4,866.87
Lubricating-oil house		374.85
Workshop		410.74
		7,001.69
Operation and maintenance during construction		48,405.87
Care of plant during nonuse	139.83	4,442.13
Gross construction cost	2.22	385,467.57
Less revenues earned during construction period:		
Rental of buildings	120.00	979.58
Contractors' freight refunds		1,911.73
Forfeitures by defaulting contractors		5,800.00
Other revenues unclassified		13.00
Profit on mess-house operations		860.82
Profit on hospital operations		585.58
	120.00	10,150.71
Net cost of construction to June 30, 1917		375,316.86

[1] Deduct.

Estimated cost of contemplated work on Garden City project during fiscal year 1918.

Pumping for irrigation; care of and disposal of plant $500

MONTANA, HUNTLEY PROJECT.

R. H. FIFIELD, project manager, Huntley, Mont.

LOCATION.

County: Yellowstone.
Townships: 2 and 3 N., Rs. 27 to 31 E., Montana meridian.
Railroads: Northern Pacific; Chicago, Burlington & Quincy.
Railroad stations and estimated population January 1, 1917: Huntley, 200; Osborn;[1] Worden, 150; Newton;[1] Pompeys Pillar, 100; Bull Mountain;[1] Ballantyne, 150; and Anita,[1] Mont.

WATER SUPPLY.

Source of water supply: Yellowstone River.
Area of drainage basin: 12,000 square miles.
Annual run-off in acre-feet of Yellowstone River at Huntley (12,000 square miles), 1908 to 1916: Maximum, 7,391,600; minimum, 4,562,220; mean, 6,092,406.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service is prepared to supply water, season of 1917: 32,271 acres.
Area under water-right applications season of 1917: 27,184 acres.
Length of irrigating season: May 1 to September 30—153 days.
Average elevation of irrigable area: 3,000 feet above sea level.
Rainfall on irrigable area: 10 years, average 13.79 inches; 1916, 11.61 inches.
Range of temperature on irrigable area: −35° to 100° F.
Character of soil of irrigable area: Ranges from heavy clay to light sandy loam.
Principal products: Alfalfa, oats, sugar beets, and wheat.
Principal markets: Billings, Mont.; St. Paul and Minneapolis, Minn.; Denver, Colo.; Kansas City, Mo.; Seattle, Wash.

LANDS OPENED FOR IRRIGATION.

Dates of public notices and orders: May 21, 1907; March 3, 1909; March 13, 1912; June 23, August 9, 1913; September 24, November 3, 1914; February 27, March 20, October 9, December 23, 1915; January 15, March 15, 1916; March 20, 1917.
Location of lands opened: Tps. 2 and 3 N., Rs. 27 to 31 E., inclusive, M. M.
Present status of irrigable lands opened: 26,218.48 acres entered subject to the reclamation act, 1,377.45 acres open to entry; 3,991.68 acres in private ownership.
Limit of area of farm units: 160 acres.
Duty of water: 2½ acre-feet per acre per annum at the farm.
Building charge per acre of irrigable land: First unit, entered before December 23, 1915, public land, $30 per acre, additional charge of $4 per acre payable to Indians; private land, $50 per acre since December 1, 1913, additional charge of $15 per acre for supplemental construction for all water-right applicants subject to the terms of the extension act; and all other water-right applicants who have agreed to the increased charge; public land entered since December 23, 1915, $45 per acre. Second and third units, public land, $60 per acre, additional charge of $4 per acre payable to Indians; private land, $60 per acre.
Annual operation and maintenance charge: For lands of the third unit, 70 cents per acre-foot for water delivered during July and August, and 35 cents per acre-foot for water delivered during other months; for all other lands, $1.10 per acre-foot for water delivered during July and August, and 60 cents per acre-foot for water delivered during other months; a minimum charge of $1.10 per irrigable acre for all lands, whether water is used thereon or not, which minimum charge is credited to the amount due for water furnished at above rates; water-right applicants in the first unit who failed or refused to sign the contract for payment of the supplemental construction charge are required to pay an additional charge of $1.50 per acre of irrigable land.

[1] Less than 25 population.

CHRONOLOGICAL SUMMARY.

Reconnoissance made and preliminary surveys begun in 1904.
Construction recommended by board of engineers February 26, 1905.
Construction authorized by Secretary April 18, 1905.
First irrigation by Reclamation Service, season 1908.
First unit completed in 1908.
Second unit completed in 1915.
Entire project 85.7 per cent completed June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the Huntley project provides for the diversion of water from the south side of the Yellowstone River about 2 miles above Huntley, Mont., into a main canal which extends down the valley about 27 miles to a point 2 miles east of Bull Mountain. The greater portion of the water is distributed by gravity. Fourteen miles below the head gates a pumping plant is installed, and a small portion of the water is lifted 45 feet into a high-line canal. The high-line canal serves about 5,400 acres of land above the main canal in the vicinity of Ballantine, Anita, and Pompeys Pillar. The pumping plant is a reinforced concrete building containing two pumping units, each with a capacity of about 31 second-feet and each comprising a turbine water wheel directly connected with a centrifugal pump by means of a vertical shaft. Three hundred and ten net horsepower is developed by a 34-foot drop in the main canal.

During the present season the entire system is being utilized for irrigating purposes.

The United States claims all waste and percolating waters arising within the project, and proposes to use such waters in connection therewith.

Future operations provide for the construction of drainage canals for the relief and protection of project lands from seepage conditions, the replacing of all remaining timber structures in the first unit with permanent type structures, and the construction of necessary works to increase the water supply for lands under the pumping system.

SUMMARY OF GENERAL DATA FOR HUNTLEY PROJECT TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is complete		32,936
Public land entered to end of fiscal year	26,219	
Public land open to entry at end of fiscal year	1,377	
Public land withdrawn at end of fiscal year	1,348	
Private land	3,992	
Acreage service could have supplied season of 1916		32,271
Estimated addition in fiscal year 1918		665
Estimated acreage service can supply July 1, 1918		32,936
Acreage actually irrigated, season of 1916		18,634
Acreage cropped under irrigation, season of 1916		18,581
Crops:		
Value of irrigated crops, season of 1916		$489,071.00
Value of irrigated crops, per acre cropped		$26.32
Finances:		
Gross construction cost to end of fiscal year		$1,593,001.48
Per cent complete at end of fiscal year		85.7
Appropriated for fiscal year 1918, total		$171,000.00
Allotment for construction, fiscal year 1918		$105,300.00
Estimated per cent complete, June 30, 1918		91.7
Proposed appropriation, fiscal year 1919, for construction		$81,000.00
Estimated gross construction expenditures to June 30, 1919		$1,679,301.48
Estimated per cent complete, June 30, 1919		97
Announced construction charges per acre		$30, $45, $50, $60
Appropriation, fiscal year 1917		[1] $166,933.49

[1] Includes refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

Finances—Continued.		
Expenditures during fiscal year, chargeable to 1917 appropriation:		
Disbursements	$118,053.21	
Registered liabilities chargeable to 1917 appropriation	22,522.30	
		$140,575.51
Unencumbered balance, July 1, 1917		26,357.98
Repayments:		
Construction charges—		
Accrued to end of fiscal year		280,951.12
Collected to end of fiscal year		274,866.91
Uncollected at end of fiscal year		6,084.21
Operation and maintenance charges (public notice		
Accrued to end of fiscal year		149,010.14
Collected to end of fiscal year		136,319.02
Uncollected at end of fiscal year		12,691.12
Water rental charges—		
Accrued to end of fiscal year		447.49
Collected to end of fiscal year		544.60
Overcollection at end of fiscal year		97.11
Drainage:		
Estimated acreage damaged by seepage to end of fiscal year		1,704
Miles of drain built to end of fiscal year—		
Open	15.77	
Closed	43.29	
		59.06
Estimated acreage protected by drains built to end of fiscal year		20,000
Estimated acreage to be protected by authorized system		24,000
Cost of drainage works to end of fiscal year		$457,176.54

CONSTRUCTION DURING FISCAL YEAR.

First unit.—Construction work was in progress on closed drains Nos. 19, 20, 22, 24, 26, and 27, and open drains Nos. 16, 162, and 20. In all, 30,614 lineal feet of closed drain and 30,826 lineal feet of open drain were constructed. On open drains 9 wooden bridges, 2 flumes, and 9 dive culverts were built. On the canal system 2 wooden checks and 11 wooden farm turnouts were replaced with concrete structures. On the lateral system the following wooden structures were replaced with concrete structures: Two drops, 47 checks, 82 turnouts, 9 combination structures, 1 culvert, and 1 flume. The estimated cost of this construction over and above replacement in kind was charged to supplemental construction, and the remainder of the cost to operation and maintenance. On Auxiliary Canal F G L 23,793 cubic yards of class 1 excavation were moved, and four county road bridges and a concrete headworks were built. All construction work was performed with United States forces.

SEEPAGE AND DRAINAGE.

Seepage conditions are being gradually brought under control by the construction of open and closed drains. During the fiscal year no additional seepage areas were reported. For the calendar year 1916 operation and maintenance and construction payments were suspended on 1,731.41 acres of land that were seeped or had not been fully reclaimed from the effects of seepage.

BOARD MEETINGS.

February 12–19, 1917, inclusive; topic, additional water supply, third unit, Huntley project; personnel, Charles P. Williams and and Herbert D. Newell.

ECONOMIES OF GOVERNMENT WORK.

Advertisement soliciting proposals for the earthwork construction of Auxiliary Canal F G L was issued on April 17, 1917, and proposals were opened on April 27, 1917. One bid, of 45 cents per cubic yard, class 1 excavation, was received. The bid was considered too high and was rejected. The work was done by United States forces, with a Bucyrus drag-line machine; 23,793 cubic yards of class 1 excavation were moved, at a cost of 10½ cents per cubic yard, not including the cost of engineering, inspection, and general expense.

OPERATION AND MAINTENANCE.

The operating season of 1916 opened May 3 and closed September 30. May and June were cool, with an average rainfall, making water requirements about average for those months. July, August, and September were dry and hot, causing heavy irrigation requirements. The entire canal system of the project was in operation during the calendar year 1916.

The precipitation during May and up to June 10, 1917, was above normal, and there was no requirement for irrigation water. Since June 10 the weather has been hot and dry, and at the close of the fiscal year the system was being operated at full capacity.

Maintenance work consisted of repairs made to canals and structures, moving of weeds, cleaning sediment from canals, replacing timber structures with permanent ones, and maintaining constructed closed drains.

Historical review, Huntley project.

Item.	1912	1913	1914	1915	1916	1917 [1]
Acreage for which service was prepared to deliver water	28,805	28,805	28,805	30,826	32,271	32,271
Acreage irrigated	14,425	15,798	17,068	18,203	18,635	20,000
Miles of canal operated	194	194	194	210	210	229
Water diverted (acre-feet)	46,994	54,702	55,543	52,383	67,873	70,000
Water delivered to land (acre-feet)	21,437	24,118	24,429	17,634	21,123	24,000
Per acre of land irrigated (acre-feet)	1.50	1.53	1.43	0.97	1.13	1.20

[1] Estimated.

SETTLEMENT.

During the fiscal year there were nine new filings. Five farms changed hands by relinquishment, and 15 farms changed hands by assignment and transfer.

Fifty-four town lots—11 at Ballantine, 11 at Huntley, 31 at Pompeys Pillar, and 1 at Worden—were sold. Pompeys Pillar town site made a very substantial gain in the number of buildings erected.

Settlement data, Huntley project.

Item.	1912	1913	1914	1915	1916	1917
Total number of farms on project	585	585	586	646	691	691
Population	1,420	1,659	1,700	1,754	2,050	1,880
Number of irrigated farms	480	527	535	530	550	553
Operated by owners or managers			432	383	400	368
Operated by tenants			103	147	150	185
Population	1,420	1,659	1,700	1,754	2,050	1,880
Number of towns	8	8	8	8	8	8
Population	325	350	475	475	468	610
Total population in towns and on farms	1,745	2,009	2,175	2,229	2,518	2,490
Number of public schools	13	13	14	15	8	8
Number of churches	5	5	6	6	6	6
Number of banks	2	2	3	3	3	4
Total capital stock	$40,000	$40,000	$60,000	$60,000	$60,000	$85,000
Total amount of deposits			$220,000	$239,000	$307,414	$498,000
Total number of depositors			886	1,060	1,180	1,375
Number of relinquishments	27	16	4	2	5	5

PRINCIPAL CROPS.

The principal crops in 1916 were sugar beets, alfalfa, wheat, and oats, in the order named. These crops represented 86 per cent of the total cropped area and returned 97 per cent of the total estimated crop value for the season. A severe hailstorm on August 1 damaged 6,800 acres of crops, which reduced the estimated gross crop returns of the project $55,500.

Owing to the late and cold spring of 1917, crops on June 30 were not so far advanced as for average years. The first cutting of alfalfa is late and the crop is very short. There are approximately 20,000 acres of land under irrigation this year.

Crop report, Huntley project, Montana, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yield.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay	5,422	Tons	14,410	2.66	$8.95	$129,263	$23.84
Seed	23	Bushels	32	1.39	9.56	306	13.30
Barley	299	do	2,239	7.5	.92	2,068	6.93
Beans							
Beets, sugar	5,264	Tons	42,106	8.00	6.08	255,826	48.61
Cane	3	do	5	1.66	10.00	50	16.66
Clover hay	17	do	32	1.88	11.00	352	20.65
Clover seed	8	Bushels	30	3.75	9.13	274	34.25
Corn, Indian	174	do	1,732	9.97	.86	1,497	8.62
Corn sorghum							
Corn fodder	41	Tons	78	1.88	5.33	416	10.03
Cucumbers	12					394	33.52
Fruits, small	4					299	70.47
Garden	152					9,533	62.82
Hay	300	Tons	299	1.00	14.74	4,406	14.69
Millet	5	do	5	1.00		36	7.20
Oats	2,627	Bushels	37,795	14.38	.63	23,651	9.00
Pasture	1,393					8,867	6.36
Potatoes	54	Bushels	5,155	95.02		5,889	108.55
Sweet clover	159		46	.29	9.00	414	2.60
Wheat	2,624		31,161	11.87	1.46	45,529	17.35
Total cropped acreage	[1] 18,581		Total and average			489,071	26.32

		Areas.	Acres.	Farms.	Per cent of project.
Irrigated, no crop:					
Nonbearing orchards	17	Total irrigable area farms reported	24,572	553	74.6
Rye, beans, sorghum, no crop	36	Total irrigated area farms reported	18,634		56.5
Total irrigated acreage	18,634	Under water-right applications	24,572	553	74.6
		Total cropped area farms reported	18,581	553	56.4

[1] In addition 584 acres were dry-farmed, producing 11,560 bushels of wheat, worth $18,000.

PUBLIC NOTICES AND ORDERS.

PUBLIC NOTICE, *March 20, 1917.*

1. *Annual operation and maintenance charges.*—In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and of acts amendatory thereof and supplementary thereto, and particularly of the reclamation extension act of August 13, 1914 (38 Stat., 686), announcement is hereby made that the annual operation and maintenance charges for the irrigation season of 1917 and thereafter until further notice against all lands of the Huntley project, Montana, under public notice, shall be as follows: (*a*) For lands of the third unit, 70 cents per acre-foot for water delivered during July and August and 35 cents per acre-foot for water delivered during other months; (*b*) for all other lands, $1.10 per acre-foot for water delivered during July and August and 60 cents per acre-foot for water delivered during other months: *Provided*, That there shall be a minimum charge of $1.10 per irrigable acre for all lands, whether water is used thereon or not, which minimum charge will be credited on the amount due for water furnished at above rates. All operation and maintenance charges are due and payable on March 1 following the irrigation season.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix, p. 489.]

Feature costs of Huntley project, June 30, 1917.

Principal features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys	$3,845.63	$9,196.34
Canal system	1,818.59	691,368.56
Lateral system	22,503.41	382,781.34
Drainage system	75,174.92	458,063.51
Flood protection		3,731.03
Power system	2,228.88	2,311.02
Farm units		1,751.99
Permanent improvements		18,336.13
Telephone system		9,112.34
Plant accounts	[1] 4,754.17	14,576.61
Operation and maintenance charges transferred to and compounded with construction charges	[1] 9.00	1,772.61
Gross construction cost to June 30, 1917	100,808.26	1,593,001.48
Less revenues earned during construction period:		
Rental of buildings		315.00
Rental of grazing and farming lands		1,100.69
Rentals of telephones and tolls		406.79
Contractors' freight refunds		7,633.45
Other revenues, unclassified		212.00
Profit on hospital operations	[1] 9.59	2,816.06
	[1] 9.59	12,483.99
Net cost of construction of project to June 30, 1917		1,580,517.49

[1] Deduct.

Statement of cost by calendar years, Huntley project.

Year ending Dec. 31—	Construction.	Operation and maintenance under public notice.	Total cost.
1904	$2,393.91	.....	$2,393.91
1905	52,273.57	.....	52,273.57
1906	353,388.54	.....	353,388.54
1907	403,341.52	.....	403,341.52
1908	35,304.16	$13,062.17	48,366.33
1909	22,502.28	29,005.64	51,507.92
1910	18,889.90	23,831.19	42,721.09
1911	24,046.58	32,299.71	56,346.29
1912	125,979.24	29,838.83	155,818.07
1913	123,023.60	25,125.92	148,149.52
1914	138,078.35	28,734.61	166,812.96
1915	135,370.33	21,582.49	156,952.82
1916	114,772.14	25,792.11	140,564.25
January to June 30, 1917	43,637.36	14,838.82	58,476.18
Total	1,593,001.48	244,111.49	1,837,112.97

Statement of cost by fiscal years, Huntley project.

Year ending June 30—	Construction.	Operation and maintenance under public notice.	Total cost.
1905[1]	$30,272.90	.....	$30,272.90
1906	92,908.30	.....	92,908.30
1907	486,052.11	.....	486,052.11
1908	202,084.40	$4,397.57	206,481.97
1909	53,393.50	20,381.13	73,774.63
1910	24,650.36	18,244.69	42,895.05
1911	10,028.37	36,674.72	46,703.09
1912	87,337.62	31,821.77	119,159.39
1913	86,614.76	25,412.83	112,027.59
1914	132,166.57	30,233.07	162,399.64
1915	122,995.27	26,057.05	149,052.32
1916	163,689.06	28,802.56	192,491.62
1917	100,808.26	22,086.10	122,894.36
Total	1,593,001.48	244,111.49	1,837,112.97

[1] Year ending September 30.

Estimated cost of contemplated work, Huntley project, during fiscal year 1918.

Features.	Estimated cost during fiscal year 1918.	
	Subfeature.	Principal feature.
Examination and surveys:		
Location and estimate, Hillside Canal	$1,000	
Hydrometric work	1,000	
		$2,000
Canal system:		
Checks	1,000	
Minor structures	300	
		1,300
Lateral system:		
Preliminary and general	2,290	
Lateral and sublateral	28,421	
Headworks	1,533	
Flumes	5,790	
Siphons	11,936	
Minor structures	6,049	
		56,019
Drainage system:		
Closed drains	42,131	
Farming operations	4,000	
		46,131
Operation and maintenance under public notice:		
Operation	4,680	
Maintenance	23,320	
		28,000
Stores and other operations		250
Total		133,700

MONTANA, MILK RIVER PROJECT.

G. E. Stratton, project manager, Malta, Mont.
R. M. Snell, project manager, St. Mary storage unit, Browning, Mont
L. V. Branch, engineer, Sherburne Lakes Dam, Sherburne, Mont.

LOCATION.

Counties: Teton, Hill, Blaine, Phillips, and Valley.
Townships: 34 to 37 N., R. 14 W.; 34 N., R. 15 W.; 37 N., Rs. 11 to 13 W.; 33 to 37 N., Rs. 10 to 13 E.; 27 to 33 N., Rs. 17 to 42 E., Montana meridian.
Railroads: Great Northern and Canadian Pacific.
Railroad stations and estimated population January 1, 1917: Browning, 500; Havre, 5,650; Chinook, 1,500; Zurich, 50; Harlem, 700; Savoy, 80; Coburg, 60; Dodson, 400; Wagner, 50; Malta, 1,400; Saco, 500; Beaverton, 50; Hinsdale, 400; Glasgow, 3,500; and Nashua, Mont., 400; Cardston and Woolford, Canada.

WATER SUPPLY.

Source of water supply: St. Mary Lakes, Swiftcurrent Creek, and Milk River.
Area of drainage basin: St. Mary Lakes and Swiftcurrent Creek, 298 square miles; Milk River at Havre, 5,550 square miles; Milk River at Malta, 11,850 square miles; Milk River at Hinsdale, 20,150 square miles.
Annual run-off in acre-feet of St. Mary River (including Swiftcurrent Creek): At Babb (298 square miles), 1902–1916—maximum, 830,000; minimum, 459,250; mean, 562,250. At international line (452 square miles), 1903–1916—maximum, 1,107,300; minimum, 514,100; mean, 723,570. Of Milk River: At Havre (5,550 square miles), 1898–1916—maximum, 426,000; minimum, 17,100; mean, 194,300. At Malta (11,850 square miles), 1903–1916—maximum, 712,800; minimum, 29,400; mean, 299,800. At Hinsdale (20,150 square miles), 1908–1916—maximum, 1,210,000; minimum, 146,500; mean, 452,500.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service is prepared to supply water, season 1917: 47,000 acres.
Area under rental contracts, season 1917 (to June 30): 11,000 acres.
Length of irrigation season: From April 16 to September 30, 170 days.
Average elevation of St. Mary storage: 5,500 feet above sea level.
Average elevation of irrigable area: 2,200 feet above sea level.
Rainfall on St. Mary storage: About 24 inches, average.
Rainfall on irrigable area: At Havre, 37 years, average 13.97 inches; 1916, 20.71 inches; at Malta, 11 years, average 14 inches; 1916, 15.72 inches.
Range of temperature on irrigable area, —56° to 103° F.
Character of soil of irrigable area: Sandy loam, clayey loam, and some gumbo.
Principal products: Alfalfa and other fodder crops, grain, and vegetables.
Principal markets: Minneapolis and St. Paul, Minn., Great Falls, Mont., and local.

LANDS OPENED FOR IRRIGATION.

No lands have been opened for irrigation by public notice.

CHRONOLOGICAL SUMMARY.

Reconnoissance and preliminary surveys begun by the Reclamation Service in 1902.
Construction conditionally authorized by Secretary March 14, 1903.
Construction of St. Mary storage unit authorized by Secretary March 25, 1905.
Construction begun July 27, 1906.
Dodson diversion dam completed in January, 1910.

Treaty with Great Britain relating to distribution between Canada and the United States of the waters of St. Mary and Milk Rivers signed January 11, 1909, and proclaimed May 13, 1910.

Water delivered for irrigation in 1911.

Recommendations covering construction of the project approved by Secretary June 13, 1912.

Dodson North Canal completed in 1914.

Sherburne Lakes Reservoir begun June 29, 1914.

Vandalia diversion, Vandalia South, and Dodson South Canals completed in 1915.

Nelson Reservoir, first development completed 1915.

Nelson Reservoir South Canal begun 1915.

Bowdoin Canal begun 1915; first unit completed 1917.

Milk River unit 54 per cent completed June 30, 1917.

St. Mary storage unit 74 per cent completed June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the Milk River project provides for the storage of water in the Sherburne Lakes and the St. Mary Lakes, and its diversion through a canal 28.9 miles long, heading three-fourths of a mile below St. Mary Reservoir and discharging into the North Fork of Milk River, thence flowing through Canada for 100 miles or more and returning to the United States; the storage of water in Nelson Reservoir south of Milk River and 14 miles northeast of Malta; the discharge of stored water into Milk River as required; the diversion of water from Milk River by a dam near Chinook into two canals, one on each side of the river, for the irrigation of lands near Chinook and Harlem, comprising the Chinook division; the diversion of water from Milk River by a dam near Dodson into two canals, the northside canal irrigating lands near Dodson, Wagner, and Malta, and the southside canal conveying water to Nelson Reservoir and irrigating lands near Wagner, Malta, Bowdoin, and Ashfield; the irrigation of lands on both sides of Milk River and Beaver Creek in the vicinity of Saco and Hinsdale from the stored waters of Nelson Reservoir, comprising the Malta division; and in the Glasgow division the diversion of water at Vandalia Dam into a canal on the south side of Milk River for the irrigation of lands near Tampico, Glasgow, and Nashua. In case the normal flow of Milk River at Vandalia Dam is not sufficient for the irrigation of lands in the Glasgow division, the stored waters in Nelson Reservoir will be returned to Milk River and diverted again at Vandalia dam. The United States claims all waste, seepage, spring, and percolating water arising within the project, and proposes to use such water in connection therewith.

The features of the above irrigation plan which have been completed are: 28.9 miles of the St. Mary Canal, the Dodson and Vandalia diversion dams to the height of the fixed crest; headworks for the Dodson North, Dodson South, and Vandalia South Canals; 10 miles of the Dodson South Canal, with a capacity of 900 second-feet, including Point of Rocks equalizing reservoir, 34 miles, with a capacity of 500 second-feet, and the lateral and waste-water systems to cover 15,000 acres; 28 miles of Dodson North Canal, with a capacity of 200 second-feet at its head, including the lateral and waste-water systems for 12,000 acres; 46 miles of Vandalia South Canal, with a capacity of 300 second-feet at its head, including the lateral and waste-water systems for 19,300 acres; 18 miles of Bowdoin Canal, with a capacity of 175 second-feet at its head, including lateral and waste-water systems for 6,000 acres; Nelson Reservoir South Main Canal with a capacity of 250 second-feet at its head; and the first development of Nelson Reservoir to store 25,000 acre-feet.

The work under construction consists of the earthwork and structures for first unit lateral systems under Nelson Reservoir South and Bowdoin Canals; the permanent movable crest for Vandalia dam; Sherburne Lakes Reservoir dam; and an operation road and telephone line along the St. Mary Canal.

The principal features remaining to be completed are the Chinook division, comprising the diversion dam and the North and South Canals; Nelson Reservoir to its final development; Beaver Creek Reservoir and canals; Nelson Reservoir North and Ashfield Canals; second units of the Bowdoin and Nelson Reservoir South Canals; the permanent movable crest for Dodson dam; St. Mary Lake and Sherburne Reservoirs; the second pipe line across St. Mary River and Halls Coulee Crossing; and the second barrel of the steel flume across Spider Lake Coulee.

SUMMARY OF GENERAL DATA FOR MILK RIVER PROJECT TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is complete		220,000
Public land entered to end of fiscal year	46,000	
Public land withdrawn at end of fiscal year	25,900	
State land	9,300	
Indian land	30,000	
Private land	108,800	
Acreage service could have supplied season of 1916		40,400
Addition in fiscal year 1917		6,600
Estimated addition in fiscal year, 1918		17,000
Estimated acreage service can supply July 1, 1918		64,000
Acreage actually irrigated, season of 1916		5,518
Acreage cropped under irrigation, season of 1916		4,592
Crops:		
Value of irrigated crops, season of 1916		$70,016.40
Value of irrigated crops, per acre cropped		$15.25
Value of dry farm crops, season of 1916		$187,860.00
Value of dry farm crops, per acre cropped 1916		$13.92

DISTRIBUTION UNITS.

Finances:		
Gross construction cost to end of fiscal year		$2,987,932.84
Per cent complete at end of fiscal year		54
Appropriated for fiscal year 1918, total		$330,000.00
Allotment for construction, fiscal year 1918		$130,000.00
Estimated per cent complete, June 30, 1918		56
Proposed appropriation, fiscal year 1919, for construction		$108,000.00
Estimated gross construction expenditures to June 30, 1919		$3,225,932.84
Estimated per cent complete, June 30, 1919		58
Appropriation, fiscal year 1917		[1] $711,678.08
Expenditures during fiscal year, chargeable to 1917 appropriation—		
Disbursements	$147,796.07	
Transfers	145.11	
	$147,941.18	
Registered liabilities chargeable to 1917 appropriation	39,166.24	
Contract obligations wholly covered by 1917 appropriation	73,951.65	
Estimated engineering expenses on contract work wholly covered by 1917 appropriation	11,092.75	
		272,151.82
Unencumbered balance, July 1, 1917, for Milk River project proper. (Balance carried to St. Mary storage unit, where unencumbered balance for whole project is shown)		439,526.26
Repayments:		
Water rental charges—		
Accrued to end of fiscal year		18,568.17
Collected to end of fiscal year		13,710.59
Uncollected at end of fiscal year		4,857.58

ST. MARY STORAGE UNIT.[1]

Finances:	
Gross construction cost to end of fiscal year 1917	$2,244,513.16
Per cent complete at end of fiscal year	74
Allotment for construction, fiscal year 1918	$167,500.00
Estimated per cent complete, June 30, 1918	80
Proposed appropriation, fiscal year 1919, for construction	$69,000.00

[1] Includes refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

Finances—Continued.		
Estimated gross construction expenditures to June 30, 1919		$2,481,013.16
Estimated per cent complete, June 30, 1919		82
Balance of appropriation, fiscal year 1917, from Milk River project proper		439,526.26
Expenditures during fiscal year, chargeable to 1917 appropriation—		
Disbursements	$146,210.51	
Transfers	10,855.75	
	$157,066.26	
Registered liabilities chargeable to 1917 appropriation	28,796.27	
		185,862.53
Unencumbered balance, July 1, 1917, for entire Milk River project		253,663.73

CONSTRUCTION DURING FISCAL YEAR.

MILK RIVER PROJECT, MONTANA.

Chinook division.—Work in this division comprised the platting and sale of lots in Zurich townsite.

Malta division.—At Dodson diversion dam a taintor gate was set in the sluiceway, and the concrete and rock paving adjacent to the south abutment was completed.

On Dodson North and South Canals automatic gates for spillways were installed by Government forces.

On Bowdoin Canal system earthwork and building of structures were continued practically to completion, except for future extensions.

On Nelson Reservoir South Canal the main canal was completed. Bids were opened and contracts placed for earthwork and structures on the greater part of the lateral system. This work was about 45 per cent completed on June 30.

Glasgow division.—At Vandalia diversion dam material for the movable crest began to arrive late in October, 1916, and erection has been in progress since. On June 30 the bridge and gates were practically erected and the hoisting machinery was about 50 per cent completed. A small amount of earthwork and paving was done by Government forces below the dam.

ST. MARY STORAGE UNIT.

St. Mary Canal.—About 2 miles of highway were constructed along the canal right of way and three rock-filled cribs were constructed at Swiftcurrent Diversion.

Sherburne Lakes Dam.—The outlet tower and gate house were completed and the installation of gate-operating mechanism partially completed. After the spring floods of 1916 had subsided the bed of Swiftcurrent Creek was unwatered and necessary stripping as well as cut-off and drainage trench excavation completed. Thereafter the construction of the dam embankment across the stream channel was in progress, using materials excavated in the adjacent spillway channel. Work on this spillway channel excavation and on placing the dam embankment was approximately 50 per cent completed. Castings and structural steel for the stationary parts for the movable spillway crest were furnished by the Milwaukee Bridge Co. (Item 1) and J. & J. B. Milholland Co. (Item 2). This metal work was erected and

about 75 per cent of the concrete in the spillway crest poured. During the year the work on the dam was advanced from 49 per cent to 69 per cent completed.

SEEPAGE AND DRAINAGE.

Seepage is showing on some lands adjacent to Nelson Reservoir and Dodson Main South Canal. These areas will probably require draining at some future time, but no subsurface drains have been built yet. Surface waste-water ditches are constructed to tap each farm.

BOARD MEETINGS.

Subject, St. Mary Canal; place, Browning, Mont.; August 20, 1916; personnel, A. J. Wiley, C. P. Williams, W. W. Schlecht, J. B. Bond.

OPERATION AND MAINTENANCE.

During 1916 the Dodson North, Dodson South, and Vandalia South Canals were operated and water delivered on a water-rental basis. During 1917 the Bowdoin Canal was also operated and water delivered under water-rental basis. Up to June 30 the water supply from the Milk River was sufficient to meet demands, but the river flow diminished considerably during the closing days of the month. One hundred and twenty-five applications were received for water covering an area of 11,000 acres.

St. Mary Canal.—During the 1916 irrigation season the St. Mary Canal was operated with a small head of water, in order to puddle the canal and get it in condition to operate during the 1917 irrigation season. After the headgates were closed about half a mile of the canal was lined to prevent leakage, and at the fourteenth mile some rock seams in the bottom of the canal section were puddled. Drain boxes were placed to drain the canal banks at miles 2 and 13, where slides or settlement had occurred, and the banks were built up at miles 2, 12, 13, and 15. Work repairing banks and slides was continued during the spring of 1917 and water was turned in to run the entire length of the canal the last three days of June

Historical review, Milk River project.

Item.	1912	1913	1914	1915	1916	1917[1]
Acreage for which service was prepared to supply water	7,800	12,800	13,440	40,000	40,400	47,000
Acreage irrigated	353	2,545	2,201	4,192	5,518	10,000
Number of farms irrigated	9	41	36	48	64	110
Miles of canal operated	30	59	53	86	184	215
Water diverted (acre-feet)	2,885	4,863	4,229	13,041	61,534	52,000
Water delivered to land (acre-feet)	293	2,349	1,760	2,884	3,700	10,500
Per acre of land irrigated (acre-feet)	0.82	0.92	0.80	0.69	0.67	1.00

[1] Estimated

SETTLEMENT.

The project has not been formally opened and little progress has been made in settlement. There are several large holdings of land, but nothing has been done toward subdividing and selling the excess

areas. Two Government town sites were opened—one at Vandalia on July 1, 1916, where no lots were sold, and the other at Zurich on June 23, 1917, where 42 lots were sold. The field work of a survey of a Government town site at Bowdoin was completed.

Settlement data of irrigated district, Milk River project.

Item.	1913	1914	1915	1916	1917
Total number of farms on project	62	60	101	155	[1] 200
Population	126	130	210	430	[1] 600
Number of irrigated farms	41	37	48	64	[1] 110
Operated by owners or managers	32	25	29	37	[1] 65
Operated by tenants	9	12	19	27	[1] 45
Population	90	120	140	193	[1] 330
Number of towns	3	3	3	5	6
Population	900	1,105	1,460	4,500	[1] 5,000
Total population in towns and on farms	1,026	1,235	1,670	4,930	[1] 5,600
Number of public schools	4	5	6	14	14
Number of churches	2	6	6	14	15
Number of banks	2	3	3	7	10
Total capital stock	$75,000	$95,000	$95,000	$252,000	$375,000
Total amount of deposits	$450,000	$530,000	$600,000	$1,959,000	$3,238,000
Total number of depositors	1,400	1,700	1,800	6,615	9,156

[1] Estimated.

PRINCIPAL CROPS.

Grain occupied 25 per cent and forage crops 74 per cent of the land cropped under irrigation in 1916. The crop results from these lands follow:

Crop report of irrigated lands on Milk River project, Montana, year of 1916.

Irrigated crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa	1,335	Tons	3,399	2.5	$7.00	$23,793	$17.82
Barley	89	Bushels	2,350	26.4	.72	1,692	19.01
Corn, Indian	25	do	1,000	40.0	.75	750	30.00
Flax seed	68	do	626	9.2	2.50	1,565	23.01
Garden	11					1,715	155.91
Hay (other than alfalfa)	2,100	Tons	1,709	.8	8.00	13,672	6.51
Oats	282	Bushels	8,054	28.6	.50	4,027	14.28
Pasture	116					1,160	10.00
Potatoes	11	Bushels	1,432	130.2	1.20	1,718	156.22
Wheat	720	do	11,720	16.4	1.70	19,924	27.67
Less duplicated areas	165						
Total acreage cropped under irrigation.	4,592	Total and average				70,016	15.25
Irrigated, not cropped	447						
New alfalfa	479						
Total irrigated acreage	5,518						

Areas.	Acres.	Farms.	Per cent of project.
Total irrigable area farms reported	15,949	64	7.3
Total irrigated area farms reported: Under rental contracts	5,518	64	2.5
Total cropped area farms reported	4,592	64	2.1

Crop report of lands dry farmed on Milk River project, Montana, year of 1916.

Crops.	Area (acres).	Unit of yield.	Yields.		Value.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa	493	Tons	842	1.7	$7.00	$5,894.00	$11.95
Barley	532	Bushels	7,275	13.7	.72	5,238.00	9.84
Corn, Indian	210	do	4,122	19.6	.75	3,091.50	14.72
Flaxseed	766	do	5,574	7.3	2.50	13,935.00	18.19
Garden	24					4,198.00	174.92
Hay (other than alfalfa)	5,193	Tons	4,050	.8	8.00	32,400.00	6.24
Oats	2,302	Bushels	48,571	21.1	.50	24,285.50	10.55
Potatoes	62	do	7,692	121.1	1.20	9,230.40	148.87
Wheat	3,790	do	51,242	13.5	1.70	87,111.40	22.99
Miscellaneous	126					2,477.00	19.66
Total acreage cropped by dry farming.	13,498	Total and average				187,860.80	13.92

Areas.	Acres.	Farms.	Per cent of project.
Total irrigable area farms reported	15,496	91	7.1
Total cropped area farms reported	13,498	91	6.1

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in Appendix, p. 492.]

Feature costs of Milk River project, exclusive of St. Mary storage unit, June 30, 1917.

Principal feature.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys	$4,339.81	$105,392.62
Storage system (Nelson Reservoir)	4,777.35	50,521.93
Canal system:		
Ashfield Canal		101.21
Bowdoin Canal	10,782.76	62,110.34
Chinook Diversion		699.76
Chinook Canal		4,359.68
Dodson Diversion	2,212.33	240,821.24
Dodson North Canal	1,093.88	208,556.34
Dodson South Canal	348.97	676,711.95
Nelson Reservoir South Canal	19,694.77	116,861.24
Vandalia Diversion	36,352.18	432,812.36
Vandalia South Canal	1,283.79	404,065.37
	71,768.68	2,147,099.49
Lateral system:		
Bowdoin laterals	48,685.88	61,083.51
Dodson North laterals	512.31	112,773.78
Dodson South laterals	[1] 426.70	132,118.36
Nelson Reservoir South laterals	102,715.44	115,097.95
Vandalia South laterals	41.77	112,591.75
	151,528.70	533,665.35
Flood protection:		
Dodson South		34,074.98
Vandalia South	245.08	1,432.85
	245.08	35,507.83

[1] Deduct.

Feature costs of Milk River project, exclusive of St. Mary storage unit, June 30, 1917— Continued.

Principal feature.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Farm units:		
Bowdoin	$934.70	$934.70
Dodson North	54.24	3,756.73
Dodson South	54.25	8,664.48
Nelson Reservoir South	591.09	591.09
Vandalia South	.....	1,679.62
	1,634.28	15,626.62
Permanent improvements:		
Paisley	415.68	1,191.30
Nelson Reservoir South	7.35	17.25
Malta	165.88	14,106.62
Wagner	66.24	4,293.23
	655.15	19,608.40
Telephone system	4,484.70	4,941.86
Operation and maintenance during construction (water rental basis)	10,282.74	61,297.95
Plant accounts	2,325.00	10,000.50
Undistributed clearing accounts	4,270.29	4,270.29
Gross construction cost to June 30, 1917	256,311.78	2,987,932.84
Less revenues earned during construction period:		
Rental of buildings	244.50	1,987.63
Rental of grazing and farming lands	1,187.21	2,956.21
Rentals of irrigation water	6,734.00	18,568.17
Contractors' freight refunds	290.00	18,872.71
Forfeitures by defaulting bidders and contractors	2,050.00	3,915.26
Other revenues, unclassified	552.50	720.65
Profit on mess-house operations	42.86	3,944.38
Profit on mercantile store operations	35.11	3,632.28
Profit on hospital operations	[1] 32.63	437.38
	11,103.55	55,034.67
Net cost of construction of project, exclusive of St. Mary storage unit, to June 30, 1917	.....	2,932,898.17

Feature costs of St. Mary storage unit to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys	$1,586.54	$48,700.00
Storage system:		
St. Mary Lakes Reservoir, surveying, testing, etc	.....	38,604.85
Sherburne Lakes Reservoir, surveying, testing, etc	4,801.84	25,927.07
Sherburne Lakes Dam	74,098.28	193,289.01
Sherburne Lakes spillway	64,099.66	121,218.62
Sherburne Lakes outlet	19,678.94	139,794.55
Total, storage system	162,678.72	518,834.10
Canal system:		
Preliminary and general work	169.30	132,419.16
St. Mary Canal	25,014.47	728,604.91
Kennedy Creek crossing	.....	30,792.51
Kennedy Creek temporary headworks	.....	1,107.74
Coal Mine (abandoned)	.....	3,374.02
Temporary bridge, St. Mary River crossing	684.82	684.82
Diversion Dam and headworks	[1] 1,022.85	51,547.53
Diversion Dam, Swift Current Creek	[1] 3.00	83,285.23

[1] Deduct.

Feature costs of St. Mary storage unit to June 30, 1917—Continued.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Canal system—Continued.		
Bridges, highway across Main Canal	[1] $1,681.49	$9,806.56
Control check gate, Station 615+20	2.38	12,519.18
Control check gate, Station 91	2.36	7,866.76
Drops	717.52	83,538.97
Kennedy Creek control check and sluice gates	304.51	13,542.93
Wasteway sluice gate, Station 884	120.78	10,824.33
Culvert, Powell Creek crossing	116.24	7,505.37
Culverts, east of Cow Creek	8.80	15,862.54
Culverts, Cow Creek	180.48	5,152.70
Spider Lake Coulee flume	132.78	36,310.65
Siphon, St. Mary River crossing	[1] 8,153.10	113,837.26
Siphon, Hall's Coulee crossing	10,799.69	45,154.99
Road along St. Mary Canal	884.19	884.19
Administrative, general expense	2,135.84	11,047.69
Total, canal system	30,413.72	1,405,670.04
Flood protection:		
Kennedy Creek Dike	[1] 5,201.46	18,467.78
Earth Dikes Stations 372 and 380	228.32	1,219.70
Total, flood protection	[1] 4,973.14	19,687.48
Permanent improvements:		
Road, Browning to St. Mary Camp 9		45,665.55
Road, Babb to Cardston, Canada		5,557.34
Road, Babb to Canadian Boundary via St. Mary Camp 9		1,135.25
Road, Babb to Glacier Park Boundary		46,038.36
Road, St. Mary Chalet to Babb		1,668.11
Road, graveling Swiftcurrent Canyon Road	34.37	11,660.51
Office building, Camp 9		1,366.82
Cottages (four), Camp 9		3,954.33
Water system, Camp 9		5,322.76
Steel bridge, St. Mary River crossing	1,345.56	34,343.71
Steel bridge, Camp 2	757.87	5,723.82
Total, permanent improvements	2,137.80	162,436.56
Telephone system:		
Completed work		11,830.75
Line along St. Mary Canal	1,595.95	1,595.95
Total, telephone system	1,595.95	13,426.70
Operation and maintenance during construction	[1] 8,543.83	7,416.49
Plant accounts	[1] 31,721.07	64,852.87
Undistributed clearing accounts	3,488.92	3,488.92
Gross construction cost to June 30, 1917	156,663.61	2,244,513.16
Less revenues earned during construction period:		
Rentals of buildings	2,556.40	17,331.33
Rentals of telephones and tolls	.70	685.65
Contractors' freight refunds	258.99	6,758.09
Forfeitures by defaulting bidders and contractors	239.10	2,132.32
Other revenues unclassified	9.75	18.25
Profit on mess-house operations	[1] 2,727.99	[1] 6,530.37
Profit on mercantile store operations	140.78	4,835.12
Profit on hospital operations	[1] 957.46	1,312.68
Profit on farming operations	[1] 14.36	[1] 14.36
	[1] 494.09	26,528.71
Net cost of construction of St. Mary storage unit to June 30, 1917		2,217,984.45

[1] Deduct.

Statement of cost by calendar years, Milk River project exclusive of St. Mary storage unit.

Year ending Dec. 31.	Construction.	Operation and maintenance during construction.	Total cost.
1907	$86,882.22		$86,882.22
1908	105,749.06		105,749.06
1909	222,954.92		222,954.92
1910	153,767.51		153,767.51
1911	66,913.43	$6,379.82	73,293.25
1912	162,820.25	16,957.99	179,778.24
1913	761,123.58	13,449.85	774,573.43
1914	671,222.04	4,369.62	675,591.66
1915	332,483.85	5,789.97	338,273.82
1916	245,157.83	9,278.53	254,436.36
January to June 30, 1917	103,289.41	5,072.17	108,361.58
Plant and clearing accounts to June 30, 1917	14,270.79		14,270.79
Total	2,926,634.89	61,297.95	2,987,932.84

Statement of cost by calendar years, St. Mary storage unit.

Year ending Dec. 31.	Construction.	Operation and maintenance during construction.	Total cost.
1908	$197,453.33		$197,453.33
1909	20,578.27		20,578.27
1910	28,833.89		28,833.89
1911	20,652.46		20,652.46
1912	138,141.53		138,141.53
1913	210,408.71		210,408.71
1914	544,384.54		544,384.54
1915	738,564.09		738,564.09
1916	206,227.42	$3,371.75	209,599.17
January to June 30, 1917	63,510.64	4,044.74	67,555.38
Plant and clearing accounts to June 30, 1917	68,341.79		68,341.79
Total	2,237,096.67	7,416.49	2,244,513.16

Statement of cost by fiscal years, Milk River project exclusive of St. Mary storage unit.

Year ending June 30.	Construction.	Operation and maintenance during construction.	Total cost.
1908	$92,919.05		$92,919.05
1909	193,342.45		193,342.45
1910	216,605.81		216,605.81
1911	91,413.95	$2,723.61	94,137.56
1912	62,418.44	13,202.49	75,620.93
1913	444,475.39	19,720.21	464,195.60
1914	713,312.38	3,147.58	716,459.96
1915	616,628.95	4,541.08	621,170.03
1916	241,813.93	7,680.24	249,494.17
1917	246,029.04	10,282.74	256,311.78
Plant and clearing accounts to June 30, 1916	7,675.50		7,675.50
Total	2,926,634.89	61,297.95	2,987,932.84

Statement of cost by fiscal years, St. Mary storage unit.

Year ending June 30.	Construction.	Operation and maintenance during construction.	Total cost.
1908	$172,596.63		$172,596.63
1909	32,143.75		32,143.75
1910	26,369.09		26,369.09
1911	25,178.79		25,178.79
1912	30,424.90		30,424.90
1913	176,585.45		176,585.45
1914	296,911.39		296,911.39
1915	808,273.43		808,273.43
1916	406,831.86	$15,960.32	422,792.18
1917	165,207.44	[1] 8,543.83	156,663.61
Plant and clearing accounts to June 30, 1916	96,573.94		96,573.94
Total	2,237,096.67	7,416.49	2,244,513.16

[1] Deduct.

Estimated cost of contemplated work, Milk River project, exclusive of St. Mary storage unit, during fiscal year 1918.

Features.	Estimated cost during fiscal year 1918.	
	Subfeatures.	Principal features.
Examination and survey:		
Cooperative stream gaging by United States Geological Survey	$3,700	
Examination of lands and investigations	300	
		$4,000
Storage system:		
Nelson Reservoir—Investigation of seepage and damages to seeped lands	5,000	
Beaver Creek—Final surveys, test pits, etc	4,000	
		9,000
Canal system:		
Dodson Diversion Dam	54,000	
Dodson North and South Canals	9,800	
Nelson Reservoir South Canal	300	
Vandalia Diversion Dam and South Canal	800	
Beaver Creek Reservoir Canal	3,100	
		68,000
Lateral system:		
Dodson North and South Canal systems	7,000	
Bowdoin, Nelson Reservoir South, and Vandalia South Canal systems	4,000	
		11,000
Flood protection (general)		1,000
Farm units (general)		7,000
Permanent improvements (general)		2,000
Telephone system:		
On Nelson Reservoir South Canal	4,500	
On Vandalia South Canal	2,500	
		7,000
Operation and maintenance during construction (water-rental basis)		25,000
Total		134,000

Estimated cost of contemplated work, St. Mary storage unit, during fiscal year 1918.

Features.	Estimated cost during fiscal year 1918.	
	Sub-feature.	Principal feature.
Examination and surveys		$1,600.00
Storage works:		
Sherburne Lakes Reservoir Dam	$80,000.00	
Sherburne Lakes spillway	49,500.00	
Purchase of rights of way	5,500.00	
Roads, Altyn trail	600.00	
Plant	500.00	
		136,100.00
Canal system:		
Main Canal	13,000.00	
Kennedy Creek bridge	2,000.00	
Purchase of rights of way	1,200.00	
Plant	2,000.00	
		18,200.00
Telephone system		2,100.00
Operation and maintenance during construction:		
Operation	2,000.00	
Maintenance	10,000.00	
		12,000.00
Stores and other operations		7,500.00
		177,500.00

MONTANA, SUN RIVER PROJECT.

CHARLES P. WILLIAMS, senior engineer, Fort Shaw, Mont.

LOCATION.

Counties: Cascade, Choteau, Lewis and Clark, Teton.
Townships: 20 to 25 N., Rs. 6 E. to 8 W., Montana meridian.
Railroads: Chicago, Milwaukee & St. Paul, Great Northern.
Railroad stations and estimated population January 1, 1917: Ashuelot;[1] Bole, 69; Cordova;[1] Dracut;[1] Fairfield, 143; Fort Shaw, 40; Gilman, 250; Power, 68; Riebling;[1] Simms, 88; Sloan;[1] Sun River, 64; Vaughn, 26.

WATER SUPPLY.

Source of water supply: Sun River and tributaries, Deep Creek, Bowl Creek, and Basin Creek.
Area of drainage basins: Sun River, 1,070 square miles; Deep Creek, 260 square miles; Bowl Creek, 9 square miles; Basin Creek, 15 square miles.
Annual run-off in acre-feet: North Fork of Sun River, near Augusta, 1905–1915, and at Sun River Diversion Dam, 1916, maximum, 1,127,400; minimum, 375,700; mean, 662,800. Willow Creek, near Augusta, 1906–1916, maximum, 42,460; minimum, 8,070; mean, 21,800. Sun River, at Sun River, 1906–1912, and at Fort Shaw, 1913–1916, maximum, 1,289,000; minimum, 429,550; mean, 822,800. South Fork of Sun River, near Augusta, 1905–1916, maximum, 159,735; minimum, 28,000; mean, 81,200.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service is prepared to supply water, season of 1917: 16,244 acres
Area under water-right applications, season of 1917: 11,609 acres.
Area under rental contracts, season of 1917: 360 acres.
Area having vested water rights: 218.3 acres.
Length of irrigating season: From May 16, to October 10, 148 days.
Average elevation of irrigable area: 3,700 feet above sea level.
Rainfall on irrigable area: For 29 years, average, 11.2 inches; 1916, 17 inches.
Range of temperature on irrigable area: −40° to 100° F.
Character of soil of irrigable area: Sandy loam, clay, adobe, and alluvium.
Principal products: Hay, grain, and vegetables, live stock.
Principal markets: Great Falls, Seattle, St. Paul, Minneapolis, and Chicago.

LANDS OPENED FOR IRRIGATION.

Dates of public notices: March 26, 1908; November 19, 1910; March 28, 1911; March 2 and July 13, 1912; June 23, 1913; September 24, 1914; March 20 and March 26, 1915; January 15, 1916; and March 14, 1917.
Location of lands opened: Tps. 20 and 21 N., Rs. 1 to 3 W., Montana meridian.
Present status of irrigable lands opened: 10,866.69 acres entered subject to the reclamation act; 1,589.04 acres open to entry; 268.34 acres State land; 1,590.20 acres in private ownership which have not applied for water; 742.31 acres in private ownership which have applied for water; 218.30 acres in private ownership under vested water-right contracts; 208.79 acres in town sites; 399.77 acres in reservations other than town sites; and 260.42 acres in railroad right of way.
Limit of area of farm units: 160 acres.
Duty of water: 2 acre-feet per acre per annum at the farm.
Building charge per acre of irrigable land: $30 to $36.
Annual operation and maintenance charge: For the irrigation year 1916, $1.10 per acre of irrigable land entitling the water user to 1.5 acre-feet of water per acre, with an additional charge of 50 cents for each additional acre-foot of water used. For the

[1] Less than 25.

season of 1917, $1.25 per acre of irrigable land entitling the water user to 1 acre-foot of water per acre, with an additional charge of 50 cents for each additional acre-foot of water used.

CHRONOLOGICAL SUMMARY.

Reconnoissance made and preliminary surveys begun in 1905.
Construction of Fort Shaw unit recommended by board of engineers February 13, 1906.
Construction authorized by Secretary February 26, 1906.
Fort Shaw Main Canal completed July, 1908.
First irrigation by Reclamation Service, season of 1909.
Fort Shaw unit completed December, 1909.
Willow Creek Dam completed, present development, November 7, 1911.
Sun River Diversion Dam completed March, 1915.
Entire project 38.6 per cent completed June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the Sun River project, so far approved, provides for the storage of water in Sun River storage reservoir on the North Fork of Sun River, in the Willow Creek Reservoir on Willow Creek, and in Pishkun Reservoir north of Sun River; the diversion of water from the North Fork of Sun River through a supply canal for the Pishkun Reservoir; the diversion of water from Sun River, supplemented by stored waters released from Sun River storage and Willow Creek Reservoir, into a canal system watering lands mainly in the abandoned Fort Shaw Military Reservation; and the diversion of water from Pishkun Reservoir into the Sun River Slope Canal, supplying water for lands on the north side of Sun River.

Possible future development may include the diversion of water from Bowl and Basin Creeks, tributaries of Flathead River, across the Continental Divide to Sun River drainage; the diversion of water from the North Fork of Sun River into a supply canal for Willow Creek Reservoir; the diversion of flood waters from Deep Creek into Pishkun Reservoir; the construction of a reservoir on Muddy Creek and of a canal system leading therefrom for the irrigation of lands lying on the north side of Sun River in the vicinity of Vaughn and Manchester; the storage of water in Benton Lake Reservoir for the irrigation of lands lying north of Great Falls; and the diversion of water from the Sun River for the irrigation of lands lying west of Great Falls.

The United States claims all waste, seepage, spring, and percolating water arising within the project and proposes to use such water in connection therewith.

The Fort Shaw unit, the Willow Creek Reservoir (first development, 16,700 acre-feet), the Pishkun Supply Canal (first development of 1,000 second-feet), and the Sun River Slope Canal (first development of 500 second-feet) have been completed. The three main canals of the Greenfields division, namely, the Greenfields, South Greenfields, and Mill Coulee Canals, covering about 75,000 acres, have been excavated.

The lateral system for about 25,000 acres under the Greenfields Canal is being constructed under contract.

SUMMARY OF GENERAL DATA FOR SUN RIVER PROJECT TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is complete		173,944
Public land entered to end of fiscal year	46,819	
Public land open to entry at end of fiscal year	1,650	
Public land withdrawn at end of fiscal year	36,033	
State land	12,546	
Private land	76,896	
Acreage service could have supplied season of 1917		16,244
Estimated acreage service can supply July 1, 1918		16,244
Acreage actually irrigated, season of 1916		4,717
Acreage cropped under irrigation, season of 1916		[1] 6,425
Crops:		
Value of irrigated crops, season of 1916		$118,989.60
Value of irrigated crops, per acre cropped		$18.52

[1] Acreage cropped on 158 farms using water, season 1916, of which 4,707 acres were irrigated; 10 acres were irrigated, other than farms, making total of 4,717 acres irrigated on the project. Value of crops on above 158 units is on a cropped area of 6,425 acres.

Finances:		
Gross construction cost to end of fiscal year		$3,259,587.12
Per cent complete at end of fiscal year		38.6
Appropriated for fiscal year 1918, total		$128,000.00
Allotment for construction, fiscal year 1918		$113,600.00
Estimated per cent complete, June 30, 1918		41
Proposed appropriation, fiscal year 1919, for construction		$180,000.00
Estimated gross construction expenditures to June 30, 1919		$3,553,187.12
Estimated per cent complete, June 30, 1919		43.5
Announced construction charges per acre		$30 and $36
Appropriation, fiscal year 1917		[1]$214,696.65
Expenditures during fiscal year, chargeable to 1917 appropriation—		
Disbursements	$103,667.77	
Transfers	11,854.20	
	$115,521.97	
Registered liabilities chargeable to 1917 appropriation	19,876.28	
Contract obligations wholly covered by 1917 appropriation	9,589.68	
		144,987.93
Unencumbered balance, July 1, 1917		69,708.72
Repayments:		
Construction charges—		
Accrued to end of fiscal year		$105,784.09
Collected to end of fiscal year		102,656.18
Uncollected at end of fiscal year		3,127.91
Operation and maintenance charges (public notice)—		
Accrued to end of fiscal year		53,079.33
Collected to end of fiscal year		49,219.48
Uncollected at end of fiscal year		3,859.85
Drainage: Estimated acreage damaged by seepage to end of fiscal year		2,250

CONSTRUCTION DURING FISCAL YEAR.

At the beginning of the fiscal year work was in progress on the delivery of materials for the steel bridge and wood stave pipe for Sun River Crossing, Pishkun Canal. On the Greenfields Division work was in progress on the excavation of laterals, and on the construction of highway bridges and main canal and lateral structures. Government forces were at work on the excavation and concrete construction for Sun River Crossing, Pishkun Canal, and on canal excavation and highway bridge construction in miles 13 and 14, Sun River Slope Canal.

NORTH SIDE CANAL SYSTEM.

Material for the steel bridge at Sun River Crossing, to be furnished and erected by the Des Moines Bridge & Iron Co., was delivered at Gilman in May, 1916, but floods in Sun River and heavy roads delayed the completion of the hauling until August 6. Erection by the United States Bridge Co., subcontractors for this work, was begun August 10 and completed October 28. Extension of time for completion was granted by the department to October 16 for delays on account of high winds, scarcity of labor, and inability of the

[1] Includes refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

United States to deliver material on the north side of the river, from which it could most easily be erected.

Delivery of material for the 8-foot wood-stave pipe at Sun River crossing, to be furnished and constructed by the Pacific Tank & Pipe Co., was to have been completed July 31, 1916. Delays in securing proper inspection of material and in the execution of the contract resulted in the granting of an extension of time by the department for delivery until September 4, 1916. The material arrived at Gilman in September and delivery at the structure site was completed by the United States October 21, 1916. On account of delays in completion of the steel bridge, commencement of pipe erection was not practicable until October 28. Actual erection began November 3 and was completed December 9, 1916. The contract allowed the contractor 30 days within which to erect the pipe, but extension of time to December 9, 1916, was allowed by the department on account of unprecedented bad weather, scarcity of labor, and other minor reasons. The blow-off saddle furnished by the contractor was unsatisfactory and final acceptance of the work was refused until the contractor should furnish a satisfactory saddle, which the United States agreed to haul to the work and erect at the contractor's expense under supplemental contract. The new saddle arrived at Gilman, but the fittings were lost in transit, and at the end of the fiscal year the blow-off was still incomplete. The blow-off first furnished by the contractor is being used until it can be replaced by the new design. The pipe was filled with water in January, 1917, and all leaks calked by the contractor. Water was kept in the pipe all winter without damage to the pipe, although the minimum temperature was −39°.

Excavation and timber and concrete construction required for the Sun River crossing structure were completed by Government forces in December, 1916, although delayed by bad weather and scarcity of labor. Below tunnel No. 3 on the Pishkun Canal a reach of 500 feet of the canal was lined with concrete. This work was originally a part of that under structure contract No. 532 with Hayden Bros., but was released from the contract on account of the excavation being incomplete at the time the remainder of the structure work under this contract had been completed. This lining was begun by Government forces the middle of September and completed the last of October. An attempt was made to grout the seamy rock foundation of the drop into Pishkun Reservoir, but on unwatering the stilling pool in November it was found that the rock surface was covered with 2 to 5 feet of silt and gravel, the removal of which would be slow and expensive. Grouting was therefore postponed until continued operation of the structure should show definite requirement for its being done.

During the summer and fall of 1916 a small force of men and teams completed a short reach of the Sun River Slope Canal in miles 13 and 14, erected a timber highway bridge at mile 12 of this canal, and constructed about 12 miles of operation and maintenance road along the Pishkun and Sun River Slope Canals.

Priming of these canals was begun in April, 1917. A head of 70 to 150 second-feet was run in the Pishkun Canal and 20 to 50 second-feet in the Sun River Slope Canal. Heavy leakage developed in both canals, as a considerable portion of the material from which

they are constructed is porous gravel or seamy rock. Sun River carries little or no silt which can be carried into a canal to close such leaks. On the Pishkun Canal two hydraulic sluicing plants equipped with electric driven centrifugal pumps were installed near several of the largest leaks and fine material sluiced in from deposits above the canal. At other places blanketing of the porous sections was accomplished by teams and scrapers or dump wagons depositing fine material on the inner slope of the lower bank. At the end of the fiscal year water was running in the upper 20 miles of this canal system and had been running temporarily through 15 miles more.

LATERAL SYSTEM—GREENFIELDS DIVISION.

The excavation of about 150 miles of laterals for the Greenfields Division, first unit (25,000 acres), under contract 654 with J. E. Hilton, was begun in September, 1915, and at the beginning of the fiscal year was 75 per cent completed. The contract provided for completion June 30, 1916, but on account of delay in awarding and executing the contract, an extension of time was granted to July 24, 1916. Further extension of time to September 2, 1916, was granted on account of delays occasioned by changes in the character and amount of the work required, extra work, and adverse weather conditions. All schedules, except schedule five, were completed within the time limit and the entire contract was completed September 6, 1916.

Contract 650 with Threet Bros. & Jolley, for the construction of about 45 highway bridges over canals and laterals in this division, was 98 per cent completed at the beginning of the fiscal year. The contractor finished the small amount of work remaining to be done and completed the contract on July 12, 1916.

Work on contract 649 with the West Coast Construction Co. and Hans Pederson, for structures except highway bridges, was begun in October, 1915, but made little progress during the fiscal year 1916 except during May and June. The work was 18 per cent completed at the beginning of the fiscal year, and was to have been completed July 26, 1916. During July fair progress was made. Active work by the contractor ceased entirely on August 3. No effort was made to resume work and the contract was formally suspended by the department September 18. Plant, equipment, and supplies were taken over by the United States. On October 16 supplemental contract providing for completion of the work under the suspended contract was entered into with C. J. Erickson and William Fransen, sureties under the original contract. Severe weather early in the winter prevented active resumption of work and the late spring of 1917 further delayed progress. Active work was resumed in May, 1917, but was confined almost entirely to schedule 6, comprising the main canal structures. At the end of the fiscal year the time limit of the supplemental contract had expired and the work under it was 13.4 per cent completed.

Proposals were received March 29, 1917, for laterals and structures necessary to complete the first unit. Only one proposal was received — that of Hayden Bros. for $38,502.50. This was rejected as being too high and authority given for construction by Government forces of such portion of the work as was required to protect and utilize

the remainder of the system. Labor and teams were extremely scarce, wages high, and deliveries slow on all materials and supplies. At the end of the fiscal year an organization had been assembled, materials and supplies delivered, a team force hired, and sand and gravel deliveries begun.

On April 20, 1917, proposals were received for grading highway canal crossings in the Greenfields Division, and for excavating a spillway channel and raising the crest of the dam at Willow Creek Reservoir. I. J. Denton of Great Falls submitted the only proposals, at $462.50 and $1,278.50, respectively, and contracts were entered into with him for both pieces of work. The highway canal crossings were completed on May 26 and at the close of the fiscal year the work at Willow Creek Reservoir was 75 per cent completed.

WILLOW CREEK RESERVOIR.

Willow Creek Reservoir was drained in October, 1916, a curtain wall constructed dividing the gate well into two compartments, and an emergency gate operated by a heavy two-speed bronze mounted stand installed on the upper side of the curtain wall. The old gate, below the curtain wall, was found to be in good condition, but provision was made to replace the operating stand and stem guides, which were found to be inadequate. An air inlet was also provided extending from the top of the tower to the tunnel immediately below the gate to reduce surging in the gate well. All of this work was completed in February, 1917, except the installation of the new gate stand for the old gate, which at the end of the fiscal year was delivered ready to install.

The work under informal contract with I. J. Denton mentioned above consisted of excavating a spillway channel with bed width of 50 feet, through two low sags north of the dam, and the raising of the crest of the dam 2½ feet, thus providing additional freeboard and protection against overflow from extreme floods.

TELEPHONE SYSTEM.

During May and June, 1917, 23 miles of telephone line were constructed in the Greenfields Division to provide communication necessary for operation and maintenance of this unit. The line is metallic circuit, on 25-foot poles spaced 30 to the mile. At points where telephone instruments are required wooden instrument booths are being constructed with condulet connection to the line.

SEEPAGE AND DRAINAGE.

In the Fort Shaw unit, which contains a total irrigable area of 16,244 acres, about 2,120 acres are affected by seepage to such an extent as to prevent profitable cultivation. No drainage works have been constructed nor have any definite designs for drainage works been made. On March 28, 1914, the Fort Shaw Water Users' Association passed a resolution requesting that the United States take no further action in connection with the construction of drainage works until formally requested by the water users. Since then no further work has been done other than the determination of seeped and alkalied areas.

OPERATION AND MAINTENANCE.

FORT SHAW UNIT.

Under a notice to water users issued April 17, 1916, the irrigation season for the calendar year 1916 extended from May 1 to October 10. Late in the season a 6-day additional period, from October 23 to 28, inclusive, was arranged for the purpose of irrigating for fall plowing. The year was unusually cool and wet, which resulted in the use of little water for irrigation. Only a small portion of the grain was irrigated and a considerable acreage of alfalfa was watered but once. About one-third of the water used during the season was diverted during August, which was the driest month of the year. All crops were badly damaged by hail, the loss in many cases running from 60 to 80 per cent. The Fort Shaw Main Canal and all of the principal laterals and sublaterals were operated in 1916. The breaks and other operation difficulties which occurred were generally of minor importance and did not interfere greatly with the promptness and continuity of deliveries. The total amount of water diverted was 17,841 acre-feet, of which 5,725 acre-feet were delivered to 158 farm units, and 32 acre-feet to town sites, school districts, etc. The number of acres irrigated on farms was 4,707, compared to 4,243 for 1915 and 6,408 in 1914. The amount of water delivered per acre was 1.22 acre-feet, which was slightly in excess of the amount used in 1915 and about 0.5 acre-foot less per acre than in 1914. The fact that the duty of water was a little lower for the season of 1916 was probably due to the scarcity of farm labor, many farmers attempting to irrigate and do other work at the same time, thereby requiring more water and getting less benefit from the amount received. The operation and maintenance charge was $1.10 per acre of irrigable land, which entitled the water user to 1½ acre-feet of water per acre, an additional charge of 50 cents being made for each additional acre-foot of water delivered.

The maximum amount of water stored in Willow Creek Reservoir in 1916 was nearly 20,000 acre-feet. In 1915 the maximum storage was 16,000 acre-feet. As the supply of water in Sun River was sufficient for all requirements no stored water was used, and on October 13, 1916, the drawing off of the stored water was completed preparatory to installing a second gate in the gate chamber of the controlling works. This gate was installed during the past winter. The reservoir surface was kept low during the spring of 1917 and, although the flood discharge of Willow Creek averaged 4,000 second-feet for about 5 hours, and was in excess of the capacity of the outlet tunnel about 11 days, the discharge through the tunnel and the storage capacity of the reservoir allowed the flood to be handled without brimming the reservoir water surface above elevation 4,124.6 feet. During June and July, 1917, the crest of the dam was raised 2.5 feet and a new spillway excavated about a mile north of the dam, which will assist materially in handling flood discharges.

Warm rains in the mountains beginning about May 20 caused both the north and south forks of Sun River to rise rapidly. The south fork reached a record stage, being much higher than the maximum reached during the June, 1916, flood. On May 26 the water reached the highest stage. Large areas of farm lands on the south side of Sun

River were badly flooded and crops destroyed. The breaches in the south river bank which were eroded by the 1916 flood permitted the flood waters to leave the old river channel at a comparatively low river stage, and farms were thereby damaged which would not formerly have been inundated. Damage to the irrigation system was confined to the erosion of two short reaches of lateral banks, the partial undermining of one flume, and the washing away of one fill about 50 feet long with an average height of 2½ feet.

Due to inclement weather and early frosts, the ditches in the fall of 1916 were not in shape for the rapid prosecution of maintenance work. The spring of 1917 was cold and backward, preventing the accomplishment of maintenance work until late in the season. Maintenance work consisted of cleaning ditches, raising lateral banks, repairing structures, and rebuilding the telephone line from Fort Shaw to Willow Creek Dam.

Historical review, Sun River project

Item.	1911	1912	1913	1914	1915	1916	1917 [1]
Acreage for which service was prepared to supply water	16,346	16,346	16,346	16,346	16,346	16,322	16,244
Acreage irrigated	6,892	6,824	7,419	6,613	4,261	[2] 4,717	1,590
Miles of canal operated	121	121	121	110	100	100	95
Water diverted (acre-feet)	24,192	20,392	20,566	24,762	15,538	17,841	4,444
Water delivered to land (acre-feet)	11,380	11,688	11,187	11,468	4,653	[3] 5,757	1,047
Per acre of land irrigated (acre-feet)	1.65	1.71	1.5	1.73	1.1	1.22	.66

[1] To June 30.
[2] Includes 10 acres irrigated other than farms.
[3] Includes 32 acre-feet delivered to townsites, etc.

SETTLEMENT.

Crops were light but prices good, resulting in a fair degree of prosperity for all settlers whose crops were not destroyed by flood or injured by hail. The demand for land and land values have both increased and many farmers, anticipating still greater rise in values, are making efforts to increase the size of their holdings. Homestead entries were made and development begun upon units that previously had been inspected by prospective settlers and considered undesirable. The land transfers were, with one exception, made to local parties. Prices, with water-right charges paid, ranged from about $45 to $81 per acre. During the fiscal year 1917 there were 8 homestead entries made under the reclamation act, 3 relinquishments, 7 assignments, and 1 transfer of title. Two cancellations were made.

Prices for all kinds of farm produce were high. Aside from the increase of bank deposits and the number of depositors, there were few changes in a business way. The opening of range facilities, so that the entrymen on small units may handle more stock, and a more thorough and systematic building up of the soil, are among the needs of the project.

Settlement data, Fort Shaw unit, Sun River project.

Item.	1912	1913	1914	1915	1916	1917
Total number of farms on project	196	195	199	270	265	255
Population			523	590	[1] 600	[1] 600
Number of irrigated farms	176	179	172	200	158	[1] 175
Operated by owners or managers	146	141	159	126	103	[1] 110
Operated by tenants	30	38	13	74	55	[1] 65
Population			490	565	436	[1] 450
Number of towns	3	3	3	3	3	3
Population			203	173	179	[1] 200
Total population in towns and on farms			726	763	779	[1] 800
Number of public schools	4	4	4	4	4	4
Number of churches	1	3	3	3	4	3
Number of banks			1	1	1	1
Total capital stock			$20,000	$20,000	$20,000	$20,000
Total deposits				$44,000	$85,000	$95,000
Total depositors				300	290	310
Number of relinquishments	4	6	3	6	4	1
Number of cancellations	5	1	5	3	2	
Homestead entries		6	4	13	5	5

[1] Estimated.

PRINCIPAL CROPS.

Flood and hail reduced the crop yield in 1916, the former damaging various crops on the river bottoms in June and the latter injuring the small grain in August just prior to harvest. Alfalfa was the most important crop, there being 4,102 acres on the project. Wheat was the second crop both in acreage and value. Potatoes, oats, and barley were the other important crops in the order named. A trial was made of growing sugar beets on a commercial basis, but the season proved to be unfavorable and the results obtained were rather discouraging. The gross value of all crops produced on the Fort Shaw unit in 1916 was $129,063.28, compared to $127,388.47 for the previous year. The average value per acre for the units using water was $18.52 and for the units farmed "dry" the returns were $9.61 per acre. The prices for the principal crops varied between limits about as follows:

Alfalfa hay in field	$5.00 to $25.00 per ton.
Alfalfa hay baled	10.00 to 35.00 per ton.
Barley	.50 to .95 per bushel.
Oats	.35 to .65 per bushel.
Wheat	.95 to 2.50 per bushel.
Potatoes	1.25 to 3.00 per bushel.
Flax	1.75 to 3.00 per bushel.
Hogs	8¾ cents to 15¾ cents per pound.

The spring of 1917 has been cold and backward with sufficient moisture until the middle of June, when an extended dry period set in. The outlook at present for crops properly irrigated is excellent.

Crop report of irrigated farms, Fort Shaw unit, Sun River project, Montana, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay	3,850	Tons	6,262	1.63	$10.00	$62,617	$16.27
Barley	167	Bushels	2,853	17.03	.75	2,140	12.77
Beets, sugar	81	Tons	467	5.79	5.00	2,338	28.95
Clover seed	16	Bushels	20	1.25	12.00	240	15.00
Flax	5	do	15	3.00	2.00	30	6.00
Garden	27				110.96	3,037	110.96
Hay [1]	241	Tons	222	.92	11.41	2,530	10.47
Millet seed	3	Bushels	36	12.00	1.00	36	12.00
Oats	643	do	12,245	19.06	.55	6,735	10.48
Pasture	443				8.65	3,834	8.65
Potatoes, white	102	Bushels	10,252	100.8	1.50	15,378	151.26
Wheat	847	do	14,339	16.9	1.40	20,075	23.69
Cropped acreage	6,425	Total and average				118,990	18.52

		Areas.	Acres.	No. farms.	Per cent of project.
Number of acres irrigated on 158 farms	4,707	Total irrigable area farms reported	9,086.11	158	55.65
Irrigated, no crop	10	Total irrigable area farms reported less temporary deductions for seepage, etc	7,714.51	158	47.27
Total irrigated acreage	4,717	Total irrigated area farms reported:			
		Under water-right applications	4,590.5	154	28.13
		Under rental contracts	39	1	.24
		Vested rights	77.5	3	.47
		Total cropped area farms reported	6,425.3	158	39.37

[1] Other than alfalfa.

Crop report of farms not irrigated, Fort Shaw unit, Sun River project, Montana, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay	253	Tons	332	1.31	$10.00	$3,320	$13.12
Barley	21	Bushels	136	6.5	.75	102	4.86
Beets, sugar	5	Tons	25	4.8	5.00	125	23.81
Flax	2	Bushels	7½	.3	2.25	17	6.75
Garden	2				100.00	175	100.00
Hay, except alfalfa	25	Tons	23½	.94	10.04	236	9.44
Oats	82	Bushels	1,196	14.6	.55	657	8.02
Pasture	583				2.13	1,242	2.13
Potatoes, white	34	Bushels	2,300	68.6	1.50	3,450	108.98
Wheat	41	do	535	13	1.40	749	18.27
Total cropped acreage	1,048	Total and average				10,074	9.61

Areas.	Acres.	No. farms.	Per cent of project.
Total irrigable area farms reported	1,652.74	33	10.12
Total irrigable area farms reported less temporary deductions for seepage, etc	964.75	33	6.03
Total cropped area farms reported	1,048	33	6.42

PUBLIC NOTICES AND ORDERS.

PUBLIC NOTICE, MARCH 14, 1917.

1. *Annual operation and maintenance charges.*—In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat. 388), and of acts amendatory thereof and supplementary thereto, and particularly of the reclamation extension act of August 13, 1914 (38 Stat. 686), announcement is hereby made that the annual operation and maintenance charges for the irrigation season of 1917 and thereafter until further notice, against all lands of the Fort Shaw unit, Sun River project, Montana, under public notice, shall be a minimum charge of $1.25 per irrigable acre whether water is used thereon or not, which charge will permit the delivery of not to exceed 1 acre-foot of water per irrigable acre; and that additional water will be furnished for 50 cents per acre-foot. All operation and maintenance charges will be due and payable on March 1 of each year for the preceding irrigation season.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix, p. 494.]

Feature costs of Sun River project to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys:		
Examination and surveys	$2,807.86	$49,768.46
Experimental flumes	12.65	552.28
Experimental measuring devices	5.00	225.02
Experimental concrete pipe and blocks	84.41	84.41
	2,909.92	50,630.17
Storage system:		
Willow Creek Reservoir Dam, and outlet works	7,846.97	290,238.29
Warm Springs Reservoir (site)	1.74	32,718.59
Beaver Creek Reservoir (site)	5,576.85	26,233.80
Pishkun Reservoir	184.64	35,961.53
Muddy Creek Reservoir	74.00	736.42
Benton Lake Reservoir	143.06	1,713.59
	13,824.78	387,602.22
Canal system:		
Fort Shaw Canal	47.49	233,203.52
Pishkun Canal	58,906.12	1,201,735.10
Sun River Slope Canal	2,731.42	597,882.84
Greenfields Main Canal	1,758.56	157,241.43
Teton Canal		19,719.76
Greenfields Lake Canal	34.16	363.22
Sunnyside Canal		1,732.09
	63,477.75	2,211,877.96
Lateral system:		
Fort Shaw Division		206,362.21
Sun River Slope Canal Division	86.33	1,379.61
Greenfields Division	54,387.90	238,060.67
Mill Coulee Division	93.97	12,549.65
Teton Division		454.17
	54,568.20	458,806.31

[1] Deduct.

Feature costs of Sun River project to June 30, 1917—Continued.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1817.
Farm units:		
Fort Shaw Division	$125.28	$3,175.29
Greenfields Division	3,325.23	12,696.56
	3,450.51	15,871.85
Permanent improvements:		
Buildings	1,153.41	12,788.90
Roads	.....	28,421.03
Real estate and permanent improvements	182.78	.....
Bridges	.....	634.09
	1,336.19	41,844.02
Telephone system:		
Great Falls to Willow Creek	.....	7,474.70
Willow Creek to Warm Springs	.72	4,138.67
Willow Creek cut-off to north side	217.10	217.10
Sun River Diversion to Greenfields Main Station 225	.....	6,723.42
Greenfields Main Station 225 to Fort Shaw	14.33	3,412.70
Greenfields Division local lines	5,001.40	5,527.04
	5,233.55	27,493.63
Plant accounts	16,366.13	58,841.61
Operation and maintenance charges transferred to and compounded with construction charges	[1] 68.26	2,742.45
Unadjusted clearing accounts	3,876.90	3,876.90
Gross construction cost to June 30, 1917	164,975.67	3,259,587.12
Less revenues earned during construction period:		
Rentals of buildings	3,411.32	14,645.89
Rentals of grazing and farming land	2,282.45	9,873.16
Rentals of telephones and tolls	15.90	317.55
Contractors' freight refunds	2,353.82	18,381.79
Forfeitures by defaulting bidders and contractors	5,720.00	5,720.00
Other revenues unclassified	[1] 21,279.55	2.50
Profit on mess-house operations	[1] 1,170.04	3,546.43
Profit on mercantile-store operations	55.50	2,940.61
Profit on hospital operations	393.31	1,165.16
	[1] 8,217.29	56,593.09
Net cost of construction of project to June 30, 1917	.....	3,202,994.03

[1] Deduct.

Statement of cost by calendar years, Sun River project.

Year ending December 31—	Construction.	Operation and maintenance under public notice.	Total cost.
1902	$617.52	.....	$617.52
1903	2,022.96	.....	2,022.96
1904	11,543.66	.....	11,543.66
1905	34,821.28	.....	34,821.28
1906	20,824.18	.....	20,824.18
1907	241,530.67	.....	241,530.67
1908	81,108.04	$8,930.75	90,038.79
1909	56,344.93	14,471.51	70,816.44
1910	148,541.21	9,413.27	157,954.48
1911	100,157.42	6,849.71	107,007.13
1912	211,855.71	9,762.99	221,618.70
1913	232,342.46	12,517.66	244,860.12
1914	907,346.92	11,060.87	918,407.79
1915	899,685.75	6,926.24	906,611.99
1916	248,343.33	13,262.25	261,605.58
January to June, 1917	62,501.08	5,263.21	67,764.29
Total	3,259,587.12	98,458.46	3,358,045.58

Statement of cost by fiscal years, Sun River project.

Year ending June 30—	Construction.	Operation and maintenance under public notice.	Total cost.
1903	$622.52		$622.52
1904	2,281.04		2,281.04
1905	29,205.07		29,205.07
1906	26,466.71		26,466.71
1907	94,159.97		94,159.97
1908	210,165.72		210,165.72
1909	44,331.02	$21,275.23	65,606.25
1910	79,794.09	11,188.34	90,982.43
1911	156,749.52	4,063.00	160,812.52
1912	69,091.12	5,855.26	74,946.38
1913	274,344.16	13,997.50	288,341.66
1914	555,879.09	11,188.54	567,067.63
1915	906,948.10	8,731.58	915,679.68
1916	644,573.32	9,882.00	654,455.32
1917	164,975.67	12,277.01	177,252.68
Total	3,259,587.12	98,458.46	3,358,045.58

Estimated cost of contemplated work, Sun River project, during fiscal year 1918.

Features.	Estimated cost during fiscal year 1918.	
	Subfeature.	Principal feature.
Examination and surveys:		
Stream gagings (United States Geological Survey)	$1,500	
Examination of lands	300	
Water appropriations (United States Reclamation Service)	200	
		$2,000
Storage:		
Willow Creek Reservoir	500	
Sun River Storage (investigations)	200	
Benton Lake Reservoir (investigations)	300	
		1,000
Canal system:		
Fort Shaw Canal (supplemental construction)	500	
Pishkun Canal	2,000	
Sun River Slope Canal	28,500	
Greenfields Canal	4,000	
		35,000
Lateral system:		
Fort Shaw division (supplemental construction)	3,750	
First unit, Greenfields division	34,250	
		38,000
Irrigable lands (farm units):		
Greenfields division	2,200	
Benton division	1,800	
		4,000
Permanent improvements; Greenfields division, Fairfield:		
Operation and maintenance headquarters		9,000
Operation and maintenance during construction (water-rental basis)—Pishkun, Sun River Slope, and Greenfields canals and first unit, Greenfields division		12,000
Operation and maintenance under public notice: Fort Shaw Canal and Fort Shaw division		14,500
Stores and other operations		650
Total		116,150

MONTANA-NORTH DAKOTA, LOWER YELLOWSTONE PROJECT.

L. H. MITCHELL, project manager, Savage, Mont.

LOCATION.

Counties: Richland and Dawson, Mont.; McKenzie, N. Dak.

Townships: 18 to 26 N., Rs. 56 to 60 E., Montana meridian; 150 to 152 N., R. 104 W., fifth principal meridian.

Railroads: Northern Pacific, Great Northern, and Missouri River.

Railroad stations and estimated population January 1, 1917: Intake, 80; Burns, 25; Savage, 300; Crane, 40; Sidney, 1,300; and Fairview, Mont., 600; Dore, N. Dak., 30.

WATER SUPPLY.

Source of water supply: Yellowstone River.

Area of drainage basin: 66,000 square miles.

Annual run-off in acre-feet: Yellowstone River at Intake, Montana, 1916, 12,564,000; maximum since 1909, 13,200,000; minimum since 1909, 8,900,000.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service is prepared to deliver water, season of 1917: 42,288 acres.

Area under rental contracts, season of 1917: 27,812 acres.

Area under water-right applications, season of 1917: 1,208 acres.

Length of irrigating season: May 1 to October 10—163 days.

Average elevation of irrigable area: 1,900 feet.

Rainfall on irrigable area: 11-year average, 16.2 inches; 1916, 19.18 inches.

Range of temperature on irrigable area: −46° to 110° F.

Character of soil of irrigable area: Deep sandy loam predominates; some alkali and gumbo.

Principal products: Grain, forage crops, and vegetables.

Principal markets: Minneapolis, St. Paul, and Duluth, Minn.; local markets consume forage crops and vegetables.

LANDS OPENED FOR IRRIGATION.

Dates of public notices and orders: December 21, 1908; March 7, March 24, May 1, August 28, and November 8, 1911; March 1, and April 30, 1912; February 26, May 28, June 23, and July 21, 1913; January 19, March 4, and September 24, 1914; February 5, March 2, March 17, and March 20, 1915; January 29, March 16, and April 12, 1916.

Location of lands opened: Tps. 18 and 19 N., R. 57 E.; Tps. 19 and 20 N., R. 58 E.; Tps. 21, 22, 23, 24, and 25 N., R. 59 E.; and T. 24 N., R. 60 E., Montana principal meridian; Tps. 150 and 151 N., R. 104 W., fifth principal meridian.

Present status of irrigable area opened: 9,058 acres entered subject to the reclamation act; 105 acres open to entry; 1,068 acres State land; 31,802 acres private land.

Limit of area of farm unit: Public, 80 acres; private, 160 acres.

Duty of water: 2½ acre-feet per acre per annum at the farm.

Building charge per acre of irrigable land: $42.50 and $45; rental charge for 1917, 50 cents per acre for 1½ acre-feet; additional water at the rate of 50 cents per acre-foot.

Annual operation and maintenance charge: 75 cents per acre for 1 acre-foot; additional water at the rate of 50 cents per acre-foot.

CHRONOLOGICAL SUMMARY.

Reconnoissance made and preliminary surveys begun in 1903.

Construction recommended by board of engineers, April 23, 1904.

Construction authorized by Secretary, May 10, 1904.

Lower Yellowstone Dam completed, February 19, 1910.

First irrigation by Reclamation Service, season of 1909.

Entire project 87 per cent completed, June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the Lower Yellowstone project provides for the diversion of water from the Yellowstone River at a point 18 miles below Glendive, Mont., into a canal on the west side of the river which extends down the valley to the confluence of the Yellowstone and Missouri Rivers, conveying water for the irrigation of land lying between the canal and the Yellowstone River. The fall of the water which will be discharged from the main canal into lateral KK at a point 19 miles below the headgates will be utilized to operate turbines direct connected to centrifugal pumps for raising water to irrigate approximately 3,000 acres of excellent bench land.

The completed features are the Lower Yellowstone Dam and diversion works, the main canal for a distance of 66.4 miles, and the complete lateral system in connection therewith. Sublaterals and extensions of a few main laterals will be constructed as the needs of water users require.

The features for future construction are the pumping plant, the remaining 5 miles of the main canal, and about 52 miles of laterals, which, when completed, will irrigate approximately 15,500 acres.

SUMMARY OF GENERAL DATA FOR LOWER YELLOWSTONE PROJECT TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is complete		60,116
Public land entered to end of fiscal year	16,082	
Public land open to entry at end of fiscal year	105	
Public land withdrawn at end of fiscal year	1,567	
State land	1,653	
Private land	40,709	
Acreage service could have supplied season of 1916		42,288
Estimated addition in fiscal year 1918		494
Estimated acreage service can supply July 1, 1918		42,782
Acreage actually irrigated, season of 1916		6,020
Acreage cropped under irrigation and dry-farmed, season of 1916		22,607
Crops:		
Value of irrigated crops, season of 1916		$124,586.00
Value of irrigated crops per acre cropped		$20.70
Value of dry-farmed crops, season of 1916		$299,759.00
Value of dry-farmed crops per acre cropped		$18.07
Finances:		
Gross construction cost to end of fiscal year		$2,898,268.71
Per cent complete at end of fiscal year		87
Appropriated for fiscal year 1918, total		$38,000.00
Estimated per cent complete, June 30, 1918		87
Proposed appropriation, fiscal year 1919, for operation and maintenance during construction		$53,000.00
Estimated gross construction expenditures to June 30, 1919		$2,989,268.71
Estimated per cent complete, June 30, 1919		87
Announced construction charges per acre		$42.50 and $45
Appropriation, fiscal year 1917		[1] $51,750.00
Expenditures during fiscal year, chargeable to 1917 appropriation—		
Disbursements	$28,959.75	
Transfers	2,664.42	
	$31,624.17	
Registered liabilities chargeable to 1917 appropriation	3,484.72	
		35,108.89
Unencumbered balance, July 1, 1917		16,641.11

[1] Includes refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

Repayments:		
Construction charges—		
Accrued to end of fiscal year		$66,633.14
Collected to end of fiscal year		9,983.75
Uncollected at end of fiscal year		56,649.39
Operation and maintenance charges (public notice)—		
Accrued to end of fiscal year		137,486.96
Collected to end of fiscal year		35,744.23
Uncollected at end of fiscal year		101,742.73
Water-rental charges—		
Accrued to end of fiscal year		45,692.84
Collected to end of fiscal year		40,906.93
Uncollected at end of fiscal year		4,785.91
Drainage:		
Estimated acreage damaged by seepage to end of fiscal year		1,300
Miles of drains built to end of fiscal year—		
Open	4.5	
Closed	1.1	
		5.6
Estimated acreage protected by drains built to end of fiscal year		1,600
Estimated acreage to be protected by authorized system		1,600
Cost of drainage works to end of fiscal year		$76,440.62

SEEPAGE AND DRAINAGE.

During the fiscal year 5,800 linear feet of the drain were completed. This work was necessary in order to fulfill the agreement with D. J. Shanesy regarding time of completing Drain No. 1 through his holdings. Excavation for this drain was completed in 1914. During the two years the drain remained open from 1 to 3 feet of silt and soft sticky material had accumulated, all of which was removed by hand excavation. Work was carried on as rapidly as possible under the most unfavorable circumstances.

The area of seeped lands changed little during the year. A survey was made in August, 1916, of all seeped tracts, and the result showed that the area had increased only 12 acres, bringing the total area to 1,239 acres.

OPERATION AND MAINTENANCE.

The service was prepared to deliver water to 42,288 acres during the season of 1917. This includes 2,438 acres exempt from water charges, such as timber and brush and seeped areas. Up to June 30 the irrigated area totaled 5,975 acres; 1,437 acres under water-right application are delinquent and subject to cancellation for nonpayment.

A total of 151 miles of canals was operated or in use during 1916, comprising 66.3 miles of main canal and 84.7 miles of distributary ditches. A total of 202 miles of canals is available for the distribution of water, of which 51 miles were idle during the past season. Although some of the laterals are used for very short periods, the maintenance work of cleaning these laterals is often greater than for laterals that are constantly in use. Seventy-five per cent of the available canals were operated and maintained, although only 14 per cent of the irrigable area was irrigated.

Statistics for the project are gathered from all farms covered by rental or water-right applications, whether delinquent or not. For the season of 1916 this included 403 farms, with an irrigable area subject to water charges of 30,522 acres. Returns show that 22,607 acres were in crop, which leaves 7,915 acres, or 26 per cent, idle or in nonproductive pasture. Water was delivered to 186 farms, with an irrigable area of 15,745 acres; 6,020 acres were actually irrigated, or an average of 32 acres per farm. The remaining areas were dry farmed, as the rainfall during the growing season was sufficient for the production of good crops. Fifty-five per cent of the irrigated area was in alfalfa, and the remainder was made up of small grains and miscellaneous products. Requests for water for the irrigation of grain were increasing rapidly about the middle of July, when the heavy rain of the 16th caused a sudden termination of activities along this line. During the remainder of the season scattering deliveries were made for the irrigation of alfalfa, corn, potatoes, and gardens.

Historical review, Lower Yellowstone project.

Item.	1912	1913	1914	1915	1916	1917 to June 30.
Acreage for which service was prepared to supply water	37,880	37,799	36,250	42,300	42,288	42,288
Acreage irrigated	5,068	7,660	5,743	12,656	6,020	5,975
Miles of canal operated	125.5	133	151	163	151	159
Water diverted (acre-feet)	15,404	30,088	25,769	40,141	27,181	16,050
Water delivered to land (acre-feet)	6,058	10,250	9,143	17,970	7,545	6,138
Per acre of land irrigated (acre-feet)	1.19	1.34	1.59	1.42	1.25	1.06

SETTLEMENT.

The much-needed new settlers have been very scarce. Causes for lack of interest by new farmers can be attributed to cheaper dry lands near the project, lack of "boosters," and the unsettled condition of the water question. During the year only six new farmers located on the Lower Yellowstone project.

The increase in population of the farms was only 18; the average population per farm was 2.1. The estimated population of the towns for the last three years is as follows: 1914, 1,835; 1915, 2,145; 1916, 2,575.

The following changes in ownership were made during the year: 55 transfers of land in private ownership, 11 assignments, 1 relinquishment, and 2 homestead entries.

Settlement data, Lower Yellowstone project.

Item.	1913	1914	1915 [1]	1916 [1]	1917 to June 30.[2]
Total number of irrigable farms on project	456	512	514	514	514
Population	600	700	821	821	839
Number of irrigated farms	158	184	260	260	186
Irrigable farms operated by owners	191	140	168	168	177
Irrigable farms operated by tenants	21	153	62	62	44
Irrigable farms having neither owner nor tenant living thereon	136	171	159	159	182
Number of towns	7	8	8	8	8
Population	1,125	1,750	2,145	2,145	2,575
Total population in towns and on farms	1,725	2,450	2,966	2,966	3,414
Number of public schools	15	16	19	19	19
Number of churches	4	4	5	5	5
Number of banks	7	9	9	9	10
Total capital stock of banks	$200,000	$230,000	$230,000	$230,000	$330,000
Total amount of deposits in banks		$715,000	$908,000	$1,388,000	$2,352,000
Total number of depositors of banks		3,600	3,838	5,637	6,390

[1] Project on rental basis.

[2] Project on rental basis; estimated to June 30.

PRINCIPAL CROPS.

The value of the wheat and alfalfa crops raised on the project during 1916 constituted 53 per cent of the total value of all crops, and these two crops covered 57 per cent of the cropped area. The area planted to wheat was 1,476 acres less than in 1915, and the yield was 3.4 bushels per acre less. The unit price, however, increased from 88 cents per bushel in 1915 to $1.58 per bushel in 1916. Irrigated wheat exceeded the yield of the nonirrigated crop by 2 bushels per acre. The price locally ranged from $1.25 in September to $1.85 in November for No. 1 hard. Most of the project wheat graded from No. 2 to No. 4, due to rust attack.

Alfalfa acreage increased 907 acres for the year. This is much below the average rate of increase for the past several years as shown by the following statistics:

Year.	Alfalfa acreage.	Increase.
		Per cent.
1912	1,284	
1913	2,380	85
1914	4,184	76
1915	6,055	45
1916	6,962	15

This condition is doubtless due to lack of development of unoccupied farms. The well-to-do farms occupied by owners have reached approximately the limit of economical alfalfa acreage. Farms occupied by tenants or leased by adjacent landowners produced mostly cash crops, or are lacking in permanent improvements. It would therefore appear that further large increase in alfalfa acreage is dependent on new settlers and the development of stock feeding and dairy business.

The 1916 alfalfa crop yielded an average of 2.1 tons per acre, and the average price up to the close of the year was $8.50 in the stack. The yield was slightly below the average for the previous year, due to the fact that less than 50 per cent of the 1916 crop was irrigated. The season was also somewhat backward, and a number of fields produced only two cuttings. The following table gives proportionate acreages of the principal crops raised on the project:

Per cent of total crop acreage for the year.

Year.	Wheat.	Alfalfa.	Oats.	Barley.	Flax.	Total.
1913	42	12	14	12	7	87
1914	26	18	16	11	10	81
1915	38	27	15	6	5	91
1916	27	31	14	10	8	90

Irrigated crop report, Lower Yellowstone project, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa	3,208	Tons	7,544	2.35	$8.55	$64,501	$20.09
Alfalfa, new	130	do	30	.23	8.55	257	1.97
Alfalfa seed	6	Bushels	12	2.0	14.00	168	28.00
Barley	488	do	9,843	20.2	.79	7,776	15.93
Beans	2	do	18	9.0	8.40	151	75.60
Clover seed	7	do	35	5.0	15.00	525	75.00
Corn	46	do	1,300	28.3	.70	910	19.78
Corn fodder	40	Tons	80	2.0	8.00	640	16.00
Flaxseed	123	Bushels	1,947	15.8	2.35	4,575	37.20
Garden	28					3,300	117.86
Hay	114	Tons	158	1.4	7.50	1,185	10.39
Oats	528	Bushels	14,627	27.7	.45	6,584	12.42
Pasture	99					1,025	10.35
Potatoes	26	Bushels	5,468	210.0	.93	5,085	195.58
Wheat	1,251	do	17,202	13.8	1.60	27,523	22.00
Miscellaneous	3					381	127.00
Less duplicated areas	79						
Total cropped	6,020	Total and average				124,586	20.70

Areas.	Acres.	Farms.	Per cent of project.
Total irrigable area farms reported	15,745	186	[1] 37
Total irrigated area farms reported	6,020	186	14
Under water-right applications	50	2	
Under rental contracts	5,970	184	14
Total cropped area farms reported	13,113	186	31

[1] Based on area for which water is available.

Nonirrigated crop report, Lower Yellowstone project, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa	2,816	Tons	5,162	1.83	$8.55	$44,135	$15.68
Alfalfa, new	551	do	88	.16	8.55	752	1.36
Alfalfa seed	251	Bushels	249	1.0	14.00	3,486	13.89
Barley	1,820	do	35,420	19.5	.73	25,857	14.21
Beans	16	do	167	10.4	8.40	1,403	87.68
Clover seed	49	do	106	2.2	15.00	1,590	32.45
Corn	186	do	4,845	26.0	.70	3,392	18.23
Corn fodder	133	Tons	439	3.3	8.00	3,512	26.40
Flaxseed	1,687	Bushels	21,521	12.8	2.43	52,316	31.01
Garden	52					3,732	71.77
Hay	1,341	Tons	1,586	1.2	7.50	11,895	8.87
Oats	2,605	Bushels	73,761	28.3	.45	33,192	12.74
Pasture	176					1,396	7.93
Potatoes	127	Bushels	21,924	173.0	.93	20,389	160.55
Wheat	4,761	do	56,146	11.8	1.57	88,149	18.51
Miscellaneous	129					4,563	35.37
Less duplicated areas	113						
Total cropped	16,587	Total and average				299,759	18.07

Areas.	Acres.	Farms.	Per cent of project.
Total irrigable farms reported	28,545	[1] 369	67
Total cropped area farms reported	21,107	369	50

[1] Includes 152 farms reporting both dry and irrigated crop.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix, p. 497.]

Feature costs of Lower Yellowstone project to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys		$66,006.54
Canal system, main canal	$5,949.33	2,414,291.72
Lateral system		290,069.83
Drainage system (charged to construction)		62,829.73
Farm units		1,016.24
Permanent improvements		39,536.38
Telephone system	[1] 899.10	22,818.22
Operation and maintenance charges transferred to and compounded with construction charges		1,700.05
Gross cost of construction of project to June 30, 1917	5,050.23	2,898,268.71
Less revenues earned during construction period:		
Rentals of buildings		422.00
Rentals of irrigation water	18,515.90	45,692.84
Rentals of telephones and tolls		4,331.04
Contractors freight refunds		21,261.33
Profit on mess-house operations		[1] 4,422.69
	18,515.90	67,284.52
Net cost of construction of project to June 30, 1917		2,830,984.19

[1] Deduct.

Statement of cost by calendar years, Lower Yellowstone project.

Year ending Dec. 31—	Construction.	Operation and maintenance under public notice.	Total cost.
1904	$35,237.74		$35,237.74
1905	154,318.40		154,318.40
1906	396,619.33		396,619.33
1907	1,015,975.33		1,015,975.33
1908	919,876.95		919,876.95
1909	200,754.90	$109,192.21	309,947.11
1910	40,775.64	51,124.14	91,899.78
1911	9,132.04	68,140.91	77,272.95
1912	3,897.73	128,399.74	132,297.47
1913	34,100.32	67,621.25	101,721.57
1914	68,069.54	[1] 4,354.63	63,714.91
1915	14,180.56	27,900.80	42,081.36
1916	952.74	36,398.84	35,446.10
January to June 30, 1917	6,282.97	16,453.88	22,736.85
Total	2,898,268.71	500,877.14	3,399,145.85

[1] Deduct.

Statement of cost by fiscal years, Lower Yellowstone project.

Year ending June 30—	Construction.	Operation and maintenance under public notice.	Total cost.
1906	$294,916.59	.....	$294,916.59
1907	619,569.88	.....	619,569.88
1908	978,590.28	.....	978,590.28
1909	701,342.76	$51,080.95	752,423.71
1910	166,404.76	84,490.87	250,895.63
1911	10,847.88	50,436.92	61,284.80
1912	1,024.98	122,486.08	123,511.06
1913	12,781.50	72,027.79	84,809.29
1914	70,491.54	30,205.86	100,697.40
1915	36,657.00	21,327.09	57,984.09
1916	591.31	29,965.81	30,557.12
1917	5,050.23	38,855.77	43,906.00
Total	2,898,268.71	500,877.14	3,399,145.85

Estimated cost of contemplated work on Lower Yellowstone project during fiscal year 1918.

Features.	Amount.
Operation and maintenance during construction (water-rental basis)	$27,700.00
Plant and equipment	1,400.00
Total	29,100.00

NEBRASKA-WYOMING, NORTH PLATTE PROJECT.

ANDREW WEISS, project manager, Mitchell, Nebr.
O. T. REEDY, construction engineer, Fort Laramie unit, Fort Laramie, Wyo.

LOCATION.

Counties: Sioux, Scotts Bluff, Banner, and Morrill, Nebr.; Natrona, Carbon, Converse, Goshen, and Platte, Wyo.

Townships: 19 to 27 N., Rs. 48 to 67 W.; 26 to 30 N., Rs. 83 to 85 W., sixth principal meridian.

Railroads: Chicago, Burlington & Quincy; Union Pacific; Chicago & North Western; Colorado & Southern.

Railroad stations and estimated population, January 1, 1917: Bridgeport, 900; Bayard, 900; Minatare, 600; Scottsbluff, 5,000; Mitchell, 1,100; Morrill, 600; Henry, 100; McGrew, 100; Melbeta, 100; Gering, 2,000; and Haig, Nebr., 100; Torrington, 800; Lingle, 100; Fort Laramie, 60; Guernsey, 400, and Casper, Wyo., 6,000.

WATER SUPPLY.

Source of water supply: North Platte River.

Area of drainage basin: 12,000 square miles.

Annual run-off in acre-feet of North Platte River: At Pathfinder, Wyo. (12,000 square miles), 1906 to 1916, maximum, 2,420,000; minimum, 870,000; mean, 1,399,000. At Guernsey or Whalen, Wyo. (16,200 square miles), 1900 to 1916, maximum, 2,690,000; minimum, 983,000; mean, 1,565,000.

AGRICULTURAL AND CLIMATIC CONDITIONS.

INTERSTATE UNIT.

Area for which the service is prepared to supply water, season of 1917, 129,891 acres.

Area under water-right applications and rental contracts, season of 1916, 112,728 acres.

Length of irrigating season: From April 1 to September 30—183 days.

Average elevation of irrigable area: 4,100 feet above sea level.

Rainfall on irrigable area: 7 years, average, 14.37 inches; 1916, 10.22 inches.

Range of temperature on irrigable area: —30° to 104° F.

Character of soil of irrigable area: Sandy loam.

Principal products: Alfalfa, cereals, corn, sugar beets, and potatoes.

Principal markets: Omaha, Nebr.; Kansas City and St. Joseph, Mo.; Denver, Colo.; central Wyoming.

LANDS OPENED FOR IRRIGATION.

Dates of public notices and orders: July 29, 1907; May 29, June 16, November 12, 1908; March 3, March 27, June 2, 1909; March 12, April 4, June 6, June 25, July 2, September 10, 1910; March 7, March 24, April 21, December 30, 1911; March 13, March 14, March 19, May 23, June 24, September 5, 1912; February 5, March 11 (2), March 29, June 16, June 23, July 13, September 4, 1913; September 24, 1914; February 27, April 23, 1915; January 13, February 10, February 24, March 16, May 16, 1916; March 16, March 22, 1917.

Location of lands opened: Ts. 21 to 26 N., Rs. 51 to 65 W., sixth principal meridian.

Present status of irrigable lands opened: 82,590 acres entered subject to the reclamation act; 8 acres open to entry; 5,338 acres of State lands; 23,508 acres in private ownership; 17,837 acres of lands under the North Platte Canal & Colonization Co. tract in Wyoming.

Limit of area of farm units: Public, 80 acres; private, 160 acres.

Duty of water: Two and one-half acre-feet per acre per annum at the farm.

Charges per acre of irrigable land: Building, $45 and $55; annual operation and maintenance, 30 cents per acre-foot for water used prior to June 30; 70 cents per acre-foot for water used subsequent to June 30, with a minimum charge of $1 per acre.

CHRONOLOGICAL SUMMARY.

Reconnoissance made and preliminary surveys begun in 1902.
Construction recommended by director March 7, 1903.
Construction conditionally authorized by Secretary March 14, 1903.
First irrigation by Reclamation Service, season of 1908.
Whalen Diversion Dam completed February, 1909.
Pathfinder Dam completed June, 1909.
Pathfinder Dike completed May, 1911.
Interstate Canal, 165 miles completed June 30, 1914.
Pathfinder unit 99.1 per cent completed June 30, 1917.
Interstate unit 96.2 per cent completed June 30, 1917.
Fort Laramie unit 18.8 per cent completed June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the North Platte project provides for the storage of flood waters of North Platte River in a reservoir controlled by the Pathfinder Dam, about 3 miles below the junction of the North Platte and Sweetwater Rivers and 50 miles southwest of Casper, Wyo., and in smaller reservoirs along the canal lines; and the diversion of water from North Platte River by a dam near Whalen, Wyo., into the Interstate Canal, supplying water for lands on the north side of the river and into the Fort Laramie Canal, watering lands on the south side of the river. The United States claims all waste, seepage, spring, and percolating water arising within the project and proposes to use such water in connection therewith.

The completed features are: Pathfinder Reservoir; Whalen Diversion Dam; the first three divisions of the Interstate Canal; lateral systems of districts 1, 2, and 3 of the Interstate Canal system; Reservoir No. 1, known as Lake Alice; Reservoir No. 3, known as Lake Minatare. The Fort Laramie Canal system, covering approximately 100,000 acres, is now under construction.

SUMMARY OF GENERAL DATA FOR NORTH PLATTE PROJECT TO END OF FISCAL YEAR 1917.

INTERSTATE UNIT.

Areas:		
Irrigable acreage when project is complete		129,891
Public land entered to end of fiscal year	82,590	
Public land open to entry at end of fiscal year	8	
Public land withdrawn at end of fiscal year	610	
State land	5,338	
Private land	41,345	
Acreage service could have supplied season of 1916		129,891
Estimated addition in fiscal year, 1918		909
Estimated acreage service can supply July 1, 1918		130,800
Acreage actually irrigated, season of 1916		[1] 84,208
Acreage cropped under irrigation, season of 1916		[1] 83,354
Crops:		
Value of irrigated crops, season of 1916		[2] $1,633,390.00
Value of irrigated crops, per acre cropped		$21.85
Finances:		
Gross construction cost to end of fiscal year		$7,070,964.34
Per cent complete at end of fiscal year		96.2
Appropriated for fiscal year 1918, total		$240,000.00
Allotment for construction, fiscal year 1918		$95,000.00
Estimated per cent complete, June 30, 1918		96.2
Proposed appropriation, fiscal year 1919, for construction		$380,000.00
Estimated gross construction expenditures to June 30, 1919		$7,575,988.64
Estimated per cent complete, June 30, 1919		98
Announced construction charges per acre		$55.00
Appropriation, fiscal year 1917, for entire project		[3] $1,539,510.99

[1] Including 8,588 acres of North Platte Canal and Colonization Company land.
[2] Exclusive of North Platte Canal and Colonization Co. land.
[3] Includes balance of 1916 appropriation and refunds authorized to be added to 1917 apporpriation by sundry civil act of July 1, 1916.

Finances—Continued.		
Expenditures during fiscal year, chargeable to 1917 appropriation—		
Transfers	$207,589.00	
Registered liabilities chargeable to 1917 appropriation	24,313.65	
		$231,902.65
Unencumbered balance, July 1, 1917, Interstate unit. (Balance carried to Fort Laramie unit, where unencumbered balance for whole project is shown)		1,307,608.34
Repayments:		
Construction charges—		
Accrued to end of fiscal year		$559,474.87
Collected to end of fiscal year		502,654.05
Uncollected at end of fiscal year		56,820.82
Operation and maintenance charges (public notice):		
Accrued to end of fiscal year		$480,050.18
Collected to end of fiscal year		447,718.08
Uncollected at end of fiscal year		32,332.10
Water-rental charges—		
Accrued to end of fiscal year		$30,867.35
Collected to end of fiscal year		28,782.40
Uncollected at end of fiscal year		2,084.95
Drainage:		
Estimated acreage damaged by seepage to end of fiscal year		3,000
Miles of drains built to end of fiscal year—		
Open	20.4	
Closed	14.0	
		34.4
Estimated acreage protected by drains built to end of fiscal year		5,000
Estimated acreage to be protected by authorized system		6,000
Cost of drainage works to end of fiscal year		$194,731.93

FORT LARAMIE UNIT.

Areas:		
Irrigable acreage when project is complete		100,000
Public land entered to end of fiscal year	25,695	
Public land withdrawn at end of fiscal year	34,473	
State land	7,176	
Private land	32,656	
Estimated acreage service can supply July 1, 1918		10,000
Finances:		
Gross construction cost to end of fiscal year		$1,141,330.85
Per cent complete at end of fiscal year		18.8
Appropriated for fiscal year 1918 total		$930,000.00
Allotment for construction, fiscal year 1918		$880,000.00
Estimated per cent complete, June 30, 1918		34
Proposed appropriation, fiscal year 1919 for construction		$250,000.00
Estimated gross construction expenditures to June 30, 1919		$2,226,889.43
Estimated per cent complete, June 30, 1919		40
Balance of appropriation, fiscal year 1917, from Interstate unit		$1,307,608.34
Expenditures during fiscal year, chargeable to 1917 appropriation—		
Disbursements and transfers	$419,724.21	
Registered liabilities chargeable to 1917 appropriation	65,474.66	
Contract obligations wholly covered by 1917 appropriation	633,426.74	
Estimated engineering expenses on contract work wholly covered by 1917 appropriation	45,813.28	
		$1,164,438.89
Unencumbered balance, July 1, 1917, of entire project		$143,169.45

CONSTRUCTION DURING FISCAL YEAR.

INTERSTATE UNIT.

A concrete wasteway was built at mile 1.4 of the Interstate Canal and a concrete drop at the Sand Point wasteway at mile 10.3.

Certain betterments were made to the paving on the Minatare Dam.

The construction of a small reservoir known as the "Winters Creek Lake" was begun. The necessary construction consists chiefly of outlet works. Most of the excavation for the outlet channel and a part of the outlet structure were completed.

Most of the excavation was done for a 5-foot concrete siphon to replace a steel flume on lateral 27 M.

Some small lateral extensions were built on various parts of the project.

Surveys were begun to form a basis for an estimate of cost for the so-called Bridgeport extension of the Interstate unit.

FORT LARAMIE UNIT.

The earthwork on division 1, main canal, was completed in August, 1916. McArthur Bros. completed their contract for the earthwork on division 2 and for the three large reinforced concrete culverts on that division in November.

The Security Bridge Co., of Minneapolis, completed the Laramie River siphon, except for some cleaning up, in April, 1917, and have completed the barrel and about 50 per cent of the approaches of the Deer Creek siphon.

McArthur Bros. sublet their tunnel contract to Carlson & Vosburg, of Denver, who established camps at the lower end of tunnel No. 1 and the upper end of tunnel No. 2 in July, 1916. The two headings of tunnel No. 1 came together February 21, 1917, and tunnel No. 2 was holed through during May. The concrete lining for No. 1 was completed in June, 1917, and about 150 cubic yards of concrete were placed in the lining of the canal at the lower portal. The excavation at tunnel No. 2 is complete and the contractors are about ready to begin the lining.

On division 3 Winston Bros. Co. completed schedule 2 in February, 1917, and J. E. Hilton finished schedules 3 and 4 in June. McArthur Bros. have schedule 1 almost completed, but have asked for an extension of time to July 25.

Bids were opened September 28, 1916, for 19 miles of main canal earthwork and structures on division 4. The contract was awarded to the lowest bidder, Winston Bros. Co., who began work in December and have been making excellent progress throughout the spring.

Government forces were engaged in construction work throughout the year. In the summer of 1916 a large number of cross-drainage structures were put in on the main canal. This work was completed in October and a camp opened near Whalen headworks, from which one force was employed during the winter excavating, concreting, and riprapping at the headworks while another was employed lining Sheridan Cut. The work at the headworks, except for the gates which are to be installed this fall, was completed in

March, and Sheridan Cut the following month. During April several bridges and siphons in connection with the main canal were also constructed, and during May and June the Government forces were employed riprapping canal banks to prevent erosion by the wind and putting in minor canal structures.

A field contract has been executed for the construction of three schedules of lateral work; bids on five other schedules were rejected and will be readvertised. Advertisement and specifications have been prepared covering 18 miles of main canal work and the structures on 24 miles of main canal, which will complete both excavation and structures on the main canal up to the Nebraska-Wyoming line.

DRAINAGE.

Surveys and investigations incident to design, location, and construction of drainage works were continued during the year. These investigations include borings over the affected areas and areas likely to become seeped to determine the subsoil conditions, the elevation and periodic variation of the water table, and other factors bearing on the location and construction of drainage works.

During the year work was continued on the Sheep Creek drain. The remainder of the open drain previously built was enlarged and deepened and 2.88 miles of additional open drains and 1.13 miles of closed drain were built.

In the spring of 1917 work was begun on the Winters Creek drain and 0.42 mile of open drain and 1.42 miles of closed drain have been completed.

OPERATION AND MAINTENANCE.

The system as operated during the present season consisted of the Pathfinder Reservoir, the Whalen Diversion Dam, 95 miles of main canal, Lake Alice, 5 miles of Reservoir Supply Canal, Lake Minatare, 37 miles of High Line Canal, 42 miles of Low Line Canal, and 626 miles of laterals.

In 1916 water to the amount of 164,240 acre-feet was delivered to 1,189 farms, containing approximately 75,620 acres in crop, exclusive of the lands of the North Platte Canal & Colonization Co., to which 44,766 acre-feet of water were delivered for the irrigation of 95 farms, containing approximately 8,588 acres in crop. The average amount of water used upon the land under the Interstate unit was 2.17 acre-feet per acre and upon the land of the North Platte Canal & Colonization Co. 5.21 acre-feet per acre. The total diversion at the Whalen Dam during the irrigation season of 1916 was 383,393 acre-feet.

During the first part of the season of 1917, 94,841 acres were entitled to water under water-right application and 17,837 acres under contract with the North Platte Canal & Colonization Co. Of this amount approximately 98,590 acres were under cultivation.

Water was diverted into the Interstate Canal on April 23, 1917, and the maximum diversion to June 30 was 1,517 second-feet. On account of the heavy precipitation most of the water diverted was stored in Lakes Alice and Minatare up to June 10. Water was delivered on demand up to June 17 and on rotation thereafter.

The storage in Pathfinder Reservoir was 799,370 acre-feet on July 1, 1916, decreasing to 313,400 acre-feet on October 6, 1916, increasing to 1,181,600 acre-feet on June 25, 1917, and decreasing to

1,176,650 acre-feet on June 30, 1917. On June 25 water was running over the spillway with a depth of 4.96 feet.

A break in the Interstate Canal on July 24, 1916, suspended all irrigation for about five days. Another break on June 17, 1917, suspended irrigation for about three days on part of the project.

Historical review, North Platte project.

Item.	1912	1913	1914	1915	1916	1917
Acreage for which service was prepared to supply water	[1] 103,837	[1] 109,272	[1] 109,341	[1] 129,684	[1] 129,891	[1] 129,891
Acreage irrigated	[1] 55,631	[1] 63,366	[1] 67,700	[1] 78,057	84,208	98,590
Miles of canal operated	602	648	652	800	800	805
Water delivered to land (acre-feet)	[2] 113,251	[2] 141,489	[2] 176,915	[2] 96,467	[2] 164,240	.....
Per acre of land irrigated (acre-feet)	[2] 2.25	[2] 2.49	[2] 2.92	[2] 1.38	[2] 2.17	.....

[1] Includes North Platte Canal & Colonization Co. lands.
[2] Exclusive of lands under North Platte Canal & Colonization Co. tract.

SETTLEMENT.

Conditions on the project continued to improve during the year, due to better farming and the prevalent high prices for all farm products, although crop yields per acre were rather less than normal, owing to unfavorable seasonal conditions. The number of land transfers has been about normal. There is now only one farm unit on the project open to entry. High profits were made in feeding stock, especially lambs. Some cases of hog cholera have reappeared, but the disease is under control and does not threaten the project.

Settlement data, North Platte project.

Item.	1913	1914	1915	1916	1917
Total number of farms on project	1,270	[1] 1,270	[1] 1,456	[1] 1,467	[1] 1,406
Population	2,774	[1] 3,800	[1] 4,000	[1] 4,200	[1] 4,500
Number of irrigated farms	908	944	1,095	1,189	[1] 1,250
Operated by owners or managers	603	567	682	721	[1] 750
Operated by tenants	305	377	413	468	[1] 500
Population	([2])	3,290	3,828	3,942	[1] 4,200
Number of towns	7	7	7	7	7
Population	4,762	[1] 4,900	[1] 5,000	[1] 5,500	[1] 8,000
Total population in towns and on farms	7,536	[1] 8,700	[1] 9,000	[1] 9,700	[1] 12,200
Number of public schools	30	34	34	34	39
Number of churches	25	25	25	25	25
Number of banks	13	14	15	16	16
Total capital stock	$277,000	$302,000	$317,000	$352,000	$352,000
Total amount of deposits	$1,160,000	$1,704,000	$1,710,000	[1] $1,800,000	[1] $2,400,000
Total number of depositors	.....	.....	[1] 5,700	[1] 6,000	[1] 7,000

[1] Estimated. [2] Data not available.

PRINCIPAL CROPS.

The cropped area has continued to increase, until in 1917 it is estimated to amount to 98,590 acres, including the North Platte Canal & Colonization Co.'s lands. Of this amount about 48 per cent is in alfalfa, 31 per cent in cereals, 10 per cent in sugar beets, 6 per cent in potatoes, and the remaining 5 per cent in miscellaneous crops. The total value of the crops on the Interstate Unit for the year 1916 was $1,633,390, with an average value of $21.85 per acre, as compared with a total value of $1,263,617 and an average value of $18.55 per acre in 1915. Increased values per acre were most pronounced in the case of potatoes, alfalfa, corn, and wheat. Late spring has re-

tarded the crop in 1917, and the indications are that crops will be only about average.

Crop report, North Platte project (Interstate Unit), Nebraska-Wyoming, year of 1916.[1]

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay	32,601	Tons	59,706	1.8	$7.50	$447,795	$13.74
Alfalfa seed	859	Bushels	797	.9	9.00	7,173	8.35
Barley	4,857	do	106,096	21.8	.60	63,658	13.10
Beans	229	do	2,268	9.9	6.00	13,608	59.42
Beets, sugar and tops	9,024	Tons	92,104	10.2	6.25	575,650	63.79
Beets, stock	79	do	1,112	14.1	3.00	3,336	42.23
Cabbage	8	do	29	3.6	40.00	1,160	145.00
Corn	6,715	Bushels	125,911	18.8	.70	88,138	13.12
Cucumbers	31	Tons	14	.5	24.00	336	10.84
Fodder, cane	142	do	646	4.5	2.00	1,292	9.09
Fodder, corn	69	do	291	4.2	1.30	378	5.48
Garden	81					5,025	62.03
Hay (other)	746	Tons	656	.9	8.00	5,248	7.03
Millet seed	238	Bushels	2,305	9.7	1.00	2,305	9.68
Oats	10,375	do	191,204	18.4	.50	95,602	9.21
Pasture	3,871					38,710	10.00
Potatoes	1,735	Bushels	274,100	158.0	.90	246,690	142.18
Rye	158	do	1,012	6.4	.90	911	5.77
Squash	4	Tons	46	11.5	15.00	690	172.50
Wheat	2,617	Bushels	28,207	10.8	1.20	33,848	12.93
Miscellaneous	327					1,837	5.62
Total cropped acreage.	74,766	Total and average				1,633,390	21.85

Areas.	Acres.	Farms.	Per cent of interstate unit.[2]
Irrigable area farms reported	95,290	1,189	86
Irrigated area farms reported	75,620	1,189	68
Irrigated, no crop:			
Alfalfa seeding, nurse crop	4,937		
Under rental contracts (low line, 6,130; State land, 370)	6,500	124	5
Alfalfa seeding, without nurse crop	854		
Under water-right applications	69,120	1,065	63
Less duplicated areas	4,937		
Cropped area farms reported	74,766	1,189	67
Total irrigated acreage	75,620		

[1] Exclusive of North Platte Canal and Colonization Co. tract, in which 8,588 acres were irrigated and cropped.

[2] Public-notice lands, 95,816 acres; water-rental lands, 16,138 acres; total, 111,954 acres.

SALE OF SUPPLEMENTAL STORAGE RIGHTS FROM PATHFINDER RESERVOIR TO PRIVATE LANDS.

No additional contracts for the sale of supplemental storage water have been approved, though negotiations relating to one such contract with the Lincoln Land Co. are in progress.

The hydraulic studies mentioned in the thirteenth, fourteenth, and fifteenth annual reports are being continued by a competent hydrographer, and in cooperation with the State of Nebraska, for the purpose of determining losses in transmission and accessions from tributaries, and obtaining such other information as will aid in a determination of water rights and proper water distribution.

PUBLIC NOTICES AND ORDERS.

PUBLIC NOTICE, MARCH 16, 1917.

1. *Annual operation and maintenance charges.*—In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and of acts amendatory thereof and supplementary thereto, and par-

ticularly of the reclamation extension act of August 13, 1914 (38 Stat., 686), announcement is hereby made that the annual operation and maintenance charges for the irrigation season of 1917 and thereafter until further notice against all lands of the North Platte project, Nebraska-Wyoming, under public notice, shall be as follows: A minimum charge of $1 per irrigable acre whether water is used thereon or not; 35 cents per acre-foot for all water delivered prior to and including June 30; and 70 cents per acre-foot for all water delivered after June 30; the minimum charge of $1 to be applied in payment of the charges under the acre-foot rates. All operation and maintenance charges will be due and payable on March 1 of each year for the preceding irrigation season.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

PUBLIC NOTICE, MARCH 22, 1917.

1. In pursuance of section 4 of the reclamation act of June 17 1902 (32 Stat., 388), and acts amendatory thereof and supplementary thereto, and particularly the reclamation extension act of August 13, 1914 (38 Stat., 686), public notice for certain lands of the North Platte project, Nebraska-Wyoming, is hereby given as follows:

2. *Lands for which water will be furnished.*—Water will be furnished under said project in the irrigation season of 1917, and thereafter, for all irrigable lands not now covered by public notice that are shown on the farm-unit plats of the following townships of the sixth principal meridian, to-wit: T. 23 N., R. 53 W.; T. 22 N., R. 53 W.; T. 22 N., R. 52 W.; T. 21 N., R. 52 W.; T. 22 N., R. 51 W.; T. 21 N., R. 51 W., which plats were approved by the Secretary of the Interior on November 23, 1915, and are on file at the local land office at Alliance, Nebr., and at the office of the project manager, United States Reclamation Service, at Mitchell, Nebr.

3. *Limit of area for which water right may be secured.*—The limit of area per entry representing the acreage which, in the opinion of the Secretary of the Interior, may be reasonably required for the support of a family upon such lands, is fixed as shown upon the plats for the several farm units. The maximum limit of area for which water-right application may be made for lands in private ownership shall be 160 acres of irrigable land for each landowner.

4. *Applications for water right.*—All water-right applications must be made to the project manager, United States Reclamation Service, Mitchell, Nebr., upon forms provided for that purpose, and may be made on and after the date of this notice. No water will hereafter be furnished any of said lands except under such application.

5. *Classes of charges for water rights.*—The water-right charges are of two kinds, to wit: (1) A charge against each irrigable acre to cover cost of construction of the irrigation system, termed the "construction charge"; and (2) an annual charge against each irrigable acre to cover cost of operation and maintenance of the system, termed the "operation and maintenance charge."

6. *Construction charge.*—The construction charge shall be $55 per acre of irrigable land, payable as follows:

(*a*) For lands that were prior to August 13, 1914, subjected by contract or otherwise to the provisions of the reclamation law, said construction charge shall be paid in 10 equal annual installments, the first of which shall be paid at the time of filing water-right application, and subsequent installments shall be due and payable December 1 of each year thereafter: *Provided, however,* That if water-right application subject to the provisions of said reclamation extension act, or an acceptance of the provisions of said act, be filed within six months from the date of this notice, said construction charge shall be payable in 20 installments, the first of which shall become due and payable on December 1 following the date of water-right application, and subsequent installments on December 1 of each year thereafter, in which event the first four installments shall each be 2 per cent, the next two installments each 4 per cent, and the next 14 each 6 per cent of the total construction charge.

(*b*) For the remaining lands an initial payment of 5 per cent of the construction charge shall be made at the time of filing water-right application, and the remainder of the construction charge shall be paid in 15 annual installments, the first five of which shall each be 5 per cent and the remainder each 7 per cent of the total construction charge. The first of said 15 annual installments shall become due and payable December 1 of the fifth calendar year after the initial installment, and subsequent installments shall become due and payable on December 1 of each calendar year thereafter.

7. *Increased construction charge in certain cases.*—In all cases where water-right application for lands in private ownership or for lands under entries not subject to the reclamation act shall not be made within one year from the date of this notice, the construction charge for such land shall be increased 5 per cent each year until such application is made and an initial installment is paid.

8. *Advance payment of construction charge permissible.*—Any water-right applicant may, at his option, pay in advance the whole or any part of the construction charge owing by him within any shorter period than that prescribed by this notice.

9. *Operation and maintenance charge.*—The operation and maintenance charge for the irrigation season of 1917 and thereafter until further notice shall be as follows: Thirty-five cents per acre-foot for all water delivered prior to and including June 30, and 70 cents per acre-foot for all water delivered after June 30: *Provided,* That there shall be a minimum charge of $1 per irrigable acre whether water is used thereon or not, which minimum charge will be credited on the amount due for water furnished at above rates. All operation and maintenance charges are due and payable on March 1 following the irrigation season, except that when original water-right application is filed after August 15 in any year, the first payment of such charge becomes due March 1 of the second year thereafter.

10. *Place and manner of payment of water charges.*—All water-right charges must be paid at the office of the United States Reclamation Service at Mitchell, Nebr., in cash, or by New York draft, or money order, payable to the special fiscal agent, United States Reclamation Service.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix, p. 499.]

Feature cost of North Platte (Interstate) project, to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and survey:		
Interstate		$61,004.79
Bridgeport extension	$1,994.30	1,994.30
	1,994.30	62,999.09
Storage system:		
Pathfinder Reservoir		1,824,042.64
Lake Alice Reservoir		209,730.19
Lake Minatare Reservoir	[1] 19.74	552,086.41
Grouting	2,308.31	2,308.31
Winters Creek Lake spillway	4,056.84	4,056.84
	6,345.41	2,592,224.39
Canal system:		
Interstate (completed)		2,565,062.64
Sand Point drop	2,007.48	2,007.48
Cottonwood wasteway	3,159.11	3,159.11
	5,166.59	2,570,229.23
Lateral system:		
Rawhide Lateral District		3,819.31
Lateral District No. 1		359,652.94
Lateral District No. 2		285,034.79
Lateral District No. 3	2,833.95	286,630.34
Lateral Extension District No. 1	239.27	239.29
Lateral Extension District No. 3	322.72	322.72
Siphon Lateral 27	1,356.60	1,356.60
	4,752.54	937,055.97
Drainage system:		
Drainage investigations	2,564.44	17,734.65
OPEN DRAINS.		
Alliance	1,406.78	12,680.87
Stewart		7,723.82
Sheep Creek	7,940.85	19,038.99
Morrill		5,110.00
Dunham		1,600.32
Banner		2,681.90
Hiersche		15,022.43
Akers		192.02
Winters Creek	893.77	893.77
Nine Mile	27.23	27.23
Diversion ditches		4,584.88
CLOSED DRAINS.		
Winters Creek	7,561.80	8,086.55
Dunham		31,614.96
Sheep Creek	14,389.65	18,130.25
McAllister	785.98	21,367.35
Sunflower		16,597.70
Banner		4,449.00
Hiersche		1,269.01
	35,570.50	188,805.70
Farm units		43,003.29
Permanent improvements to June 30, 1915		57,369.17
Dutch Flats cottage	1,244.55	1,244.55
Sunflower cottage	929.47	929.49
	2,174.02	59,543.19
Operation and maintenance during construction		509,805.43
Plant accounts	35,883.88	72,091.46
Undistributed clearing accounts	35,206.59	35,206.59
Subtotal of gross construction cost of interstate unit to June 30, 1917	127,093.83	7,070,964.34

[1] Deduct.

Feature cost of Fort Laramie unit.

Examination and surveys:		
By project manager	$2,392.83	$23,985.47
By construction engineer	1,137.35	1,137.35
Guernsey storage	1,741.42	1,741.42
	5,271.60	26,864.24
Canal system:		
Survey	19,349.77	33,545.00
Whalen Dam and headworks	17,652.21	18,231.75
Tunnel No. 1	141,215.65	142,188.65
Tunnel No. 2	85,613.58	85,929.38
Earthwork	380,006.19	618,297.77
Concrete lining	15,647.09	15,741.19
Riprapping	10,510.07	10,464.85
Minor structures	1,117.97	4,651.16
Laramie River siphon	29,199.87	31,304.37
Deer Creek siphon	20,039.72	20,071.72
Bridge at Station 433	1,099.64	1,099.64
Bridge at Station 640	717.73	717.73
Wasteway at Station 171	228.12	228.12
Wasteway at Station 472	2,045.86	2,045.86
Wasteway at Station 715	450.37	450.37
Siphon at Station 418	3,441.73	3,441.73
Siphon at Station 444	902.82	902.82
Culvert at Station 1495	6,187.55	6,187.55
Bridge at Station 343	2,136.64	2,136.64
Paving Sheridan cut	416.83	416.83
Siphon at Station 519	440.38	1,313.74
Culvert at Station 611	190.79	1,073.46
Culvert at Station 561	7,455.17	7,853.62
Culvert at Station 767	8,286.19	8,697.54
Culvert at Station 916	7,819.77	7,929.17
Culvert at station 640	592.77	1,677.49
Culvert at Station 850	1,977.17	2,005.08
Culvert at Station 1235	2,613.12	2,649.77
Culvert at Station 988	664.70	674.00
Culvert at Station 1009	1,818.57	1,844.37
Siphon Horse Creek	205.00	205.00
Frederick Bridge	1,159.46	1,159.46
Culvert, Station 1815	440.00	440.00
Culvert, Station 1822	582.41	582.41
	772,224.91	1,036,158.24
Lateral system:		
Surveys	16,413.30	16,413.30
Earthwork	2,968.10	2,968.10
Minor structures	516.42	516.42
	19,897.82	19,897.82
Farm units, surveys	401.63	708.52
Permanent improvements:		
Roads		59.30
Bridges	1,749.59	1,749.59
	1,749.59	1,808.89
Plant accounts	29,889.95	55,893.14
Subtotal of gross construction cost of Fort Laramie unit to June 30, 1917	829,435.50	1,141,330.85
Grand total of gross construction cost of entire project to June 30, 1917	956,529.33	8,212,295.19
Less revenue earned during construction period:		
Rental of buildings	1,078.67	6,464.35
Rental of grazing and farming lands	2,232.29	10,546.73
Rentals of irrigation water	[1] 1,592.00	17,736.30
Contractor's freight refunds	15,414.96	30,966.76
Forfeitures by defaulting bidders and contractors	13.42	16,318.42
Other revenues, unclassified	11.74	1,914.53
Profit on messhouse operations	[1] 7,671.46	[1] 21,089.15
Profit on mercantile store operations		4,806.93
Profit on hospital operations	127.07	6,493.90
	9,614.69	74,158.77
Net cost of construction of project to June 30, 1917		8,138,136.42

[1] Deduct.

Statement of cost by calendar years, North Platte project.

Year ending Dec. 31—	Construction.	Operation and maintenance.			Total cost.
		During construction.	Under public notice.	Total operation and maintenance.	
1904	$95,000.00				$95,000.00
1905	692,795.80				692,795.80
1906	1,219,052.96				1,219,052.96
1907	961,096.48	$2,408.39		$2,408.39	963,504.87
1908	614,953.87	8,486.18		8,486.18	623,440.05
1909	475,899.91	63,353.75		63,353.75	539,253.66
1910	448,638.71	173,660.95	$50,697.30	224,358.25	672,996.96
1911	416,951.93	135,303.36	63,062.13	198,365.49	615,317.42
1912	355,625.45	11,587.00	65,791.53	77,378.53	433,003.98
1913	397,426.87	12,250.75	74,442.49	86,693.24	484,120.11
1914	434,328.31	16,250.00	84,026.75	100,276.75	534,605.06
1915	324,067.45	5,156.80	114,850.00	120,006.80	444,074.25
1916	644,736.59		119,693.74	119,693.74	764,430.33
January to June 30, 1917	458, 24.24		52,405.66	52,405.66	511,129.90
		81,348.25	[1] 81,348.25		
Plant accounts	127,984.60				127,984.60
Undistributed clearing accounts	35,206.59				35,206.59
Total	7,702,489.76	509,805.43	543,621.35	1,053,426.78	8,755,916.54

[1] Compounded with construction under reclamation extension act.

Statement of cost by fiscal years, North Platte project.

Year ending June 30—	Construction.	Operation and maintenance.			Total cost.
		During construction.	Under public notice.	Total operation and maintenance.	
1905	$190,000.00				$190,000.00
1906	1,195,591.61	$2,408.39		$2,408.39	1,198,000.00
1907	1,242,513.82	8,486.18		8,486.18	1,251,000.00
1908	679,680.98	63,353.75		63,353.75	743,034.73
1909	550,226.76	173,660.95		173,660.95	723,887.71
1910	401,573.07	135,303.36		135,303.36	536,876.43
1911	495,704.37	11,587.00	$101,394.61	112,981.61	608,685.98
1912	338,198.89	12,250.75	64,729.66	76,980.41	415,179.30
1913	373,052.00	16,250.00	66,853.40	83,103.40	456,155.40
1914	421,780.94	5,156.80	82,031.58	87,188.38	508,969.32
1915	446,895.69		86,021.92	86,021.92	532,917.61
1916	348,531.53		108,423.94	108,423.94	456,955.47
1917	956,529.33		115,514.49	115,514.49	1,072,043.82
		81,348.25	[1] 81,348.25		
Plant accounts to June 30, 1916	62,210.77				62,210.77
Total	7,702,489.76	509,805.43	543,621.35	1,053,426.78	8,755,916.54

[1] Compounded with construction under reclamation extension act.

Estimated cost of contemplated work, North Platte (interstate) project, during fiscal year 1918.

Features.	Estimated cost during fiscal year 1918.	
	Subfeature.	Principal feature.
Examination and surveys, Bridgeport extension		$8,000
Storage works, Winters Creek Lake		5,000
Lateral system:		
Lateral extension	$2,000	
Siphon lateral 27	5,000	
		7,000
Drainage system:		
Open drains	52,000	
Closed drains	25,000	
		77,000
Permanent improvements, cottages		3,000
Operation and maintenance under public notice		135,000
Stores and other operations		5,000
Total		240,000

Estimated cost of contemplated work, Fort Laramie unit, during fiscal year 1918.

Features.	Estimated cost during fiscal year 1918.	
	Subfeature.	Principal feature.
Canal system:		
Preliminary and general (surveys, location, cross sectioning, test boring, etc., on about 30 miles of main canal)	$15,000	
Whalen diversion headworks (installing gates)	1,000	
Main canal excavation from mile 68 to mile 86	248,000	
Flumes: Katzer flume	1,000	
Bridges: Seven highway bridges across main canal and service bridge at headworks	19,000	
Siphons: Horse Creek siphon	38,000	
Wasteways: Two standard wasteways and one sand box on main canal	18,000	
Culverts and drains: Two large and two small culverts on main canal between Mile 68 and mile 86	31,000	
		$371,000
Lateral system:		
Preliminary and general work, topography, surveys, location, designs, etc., on about 38,000 acres	25,000	
Headworks: Lateral turnouts from main canal from mile 24 to mile 86	15,000	
Laterals and sublaterals, from Cherry Creek to State line, about 38,000 acres	153,000	
Structures: Drops, turnouts, weirs, crossings, and other minor structures on about 51,000 acres from mile 24 to mile 86	209,000	
		402,000
Drainage system:		
Preliminary and general work: Surveys, test borings, designs, etc	2,500	
Open drains: Main Cherry Creek drainage channel	42,000	
Bridges on above drain	6,500	
		51,000
Farm units: Preliminary and general: Surveys, irrigable areas, plats, etc		15,000
Permanent improvements: Proposed headquarters buildings, etc., for unit		8,000
Telephone system: Construction of about 40 miles of line		7,000
Stores and other operations		6,000
Plant and equipment: Camp, corrals, vehicles, etc		20,000
Total		880,000

NEVADA, TRUCKEE-CARSON PROJECT.

JOHN T. WHISTLER, project manager, Fallon, Nev.

LOCATION.

Counties: Churchill, Storey, and Lyon.

Townships: 17 and 18 N., Rs. 17 to 30 E.; 19 N., Rs. 26 to 31 E.; 20 N., Rs. 22 to 31 E., Mount Diablo meridian.

Railroad: Southern Pacific.

Railroad stations and estimated population, January 1, 1917: Fernley, 60; Hazen, 200; Fallon, 1,500; Lahontan, 15; Stillwater, 50.

WATER SUPPLY.

Source of water supply: Truckee and Carson Rivers.

Area of drainage basin: 3,450 square miles.

Annual run-off in acre-feet: Truckee River at Tahoe (519 square miles), 1901 to 1916, maximum, 704,000; minimum, 113,000; mean, 278,500. Truckee River near Derby (1,740 square miles), 1900 to 1916, maximum, 1,435,000; minimum, 356,000; mean, 819,500. Carson River at Empire (988 square miles), 1901 to 1916, maximum, 731,000; minimum, 172,000; mean, 394,500.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which service is prepared to supply water, season 1917: 83,942 acres.

Area under water-right applications and rental contracts, season 1917: 48,775 acres.

Length of irrigation season: From April 1 to October 15, 198 days.

Average elevation of irrigable area: 4,000 feet above sea level.

Rainfall on irrigable area: Average 4 inches (maximum record 1913, 8.08 inches).

Range of temperature on irrigable area: −20° to 100° F.

Character of soil of irrigable area: Exceedingly variable; sand, sandy loam, adobe, clay, and volcanic ash.

Principal products: Alfalfa, small grain, potatoes, onions, sugar beets, truck crops, and dairy products.

Principal markets: Nevada and Pacific coast communities.

LANDS OPENED FOR IRRIGATION.

Dates of public notices and orders: May 6, November 1, 1907; January 30, April 4, June 5, December 26, 1908; March 1, September 28, 1909; April 26, September 16, 1910; April 22, October 17, 1911; February 8, June 13, 1912; January 17, June 23, July 15, July 21, 1913; August 19, December 16, 1914; January 30, February 26, March 20, May 13, November 12, 1915; January 17, February 11, 1916; instructions under act of July 26, 1916, providing for acceptance of terms of the reclamation extension act; public notice March 10, March 22, 1917.

Location of lands opened: Ts. 17 to 20 N., Rs. 23 to 31 E., Mount Diablo meridian.

Present status of irrigable lands.

	Acres.
Public homestead:	
Entered	20,422
Open to entry	4,211
Withdrawn	98,887
Total	123,520
Indian:	
On approved plats	4,077
Not shown on plats	563
Total	4,640

	Acres.
Private:	
Covered by water right application	8,898
Open to water-right application	10,209
Not shown on plats	12,405
Total subject to water-right application	31,512
Settled vested rights	13,083
Unsettled vested rights	6,340
Total vested lands	19,423
Total private lands	50,725
State, not shown on plats, total	215
Railroad:	
Covered by water-right application	2,257
Open to water-right application	1,648
Not shown on plats	22,995
Total railroad lands	26,900
Total, entire project	206,000

Limit of area of farm units: 40 to 160 acres.
Duty of water: 3 acre-feet per acre per annum at the farm.
Building charge per acre of irrigable lands: $22, $30, and $60.
Annual operation and maintenance charge per acre of irrigable land: Approximately $1.25 per acre, based on cost of service.

CHRONOLOGICAL SUMMARY.

Reconnaissance made and preliminary surveys begun in 1902.
Construction recommended by director, March 7, 1903.
Construction conditionally authorized by Secretary, March 14, 1903.
Truckee Canal completed June, 1905.
Carson River headworks and main distributing canals completed September, 1905.
First irrigation by Reclamation Service season of 1906.
Truckee Canal chute completed November, 1910.
Lahontan Dam commenced January, 1911.
Lahontan Dam completed June, 1915.
United States took possession of outlet works at Lake Tahoe and assumed control July 1, 1915.
Project manager instructed by reclamation commission to take preliminary steps toward preparation of unentered farm units for irrigation and cultivation April 19, 1916.
Commencement of preparation of unentered farm units by the Government in advance of settlement May 25, 1917.
Entire project 63.5 per cent completed June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the Truckee-Carson project provides for the storage of water on the headwaters of Truckee River, in Lake Tahoe, in the Mud Lake reservoir, near Churchill, Nev., and in Lahontan Reservoir on Carson River; the diversion of water from Truckee River by a dam about 20 miles below Reno, Nev., into the Truckee Canal, supplying water to lands in the Truckee and Carson River valleys and to the Lahontan Reservoir; the diversion of water from Carson River by a dam near Dayton, Nev., for storage in Alkali Flat Reservoir and irrigating lands in Churchill Valley below that reservoir; and the diversion of water from Carson River by a dam about 5 miles below the Lahontan storage dam into two canal systems, one on either side of the river, watering lands in the lower Carson River valley. The United States intends, for and in connection with the project, to use the waste, seepage, spring, and percolating water arising within the same and asserts a right thereto by virtue of its reservation of all unappropriated waters of the project source of supply and of its appropriation of said waters heretofore made for the purposes of the project in accordance with the State law.

The features of the above irrigation plan which have been completed are: The dam at the outlet of Lake Tahoe, including the greater portion of the accessory dredging of the Truckee River channel; the diversion dam in Truckee River near Derby, Nev., the Truckee Canal carrying water from this diversion 31 miles to the terminal concrete chute discharging into the Lahontan Reservoir; the forebay for the hydroelectric plant discharging Truckee Canal water into Carson River below Lahontan Dam; the diversion dam in Carson River situated about 5 miles below Lahontan Dam; that portion of the irrigation system which includes laterals taken out of Truckee Canal in the vicinity of Fernley and Hazen; and the two main canals heading at Carson diversion dam and extending over the main portions of the project in Carson sink, with Fallon as a center.

Construction of Lahontan Dam and Reservoir was completed in June, 1915, for the conservation of the flood waters in both the Truckee and Carson Rivers.

The features remaining for future construction are: The Alkali Flat Reservoir, or equivalent reservoirs in the upper Carson Valley, as may later be determined; the upper Truckee storage reservoirs as required; the extension of the irrigation system to cover additional irrigable areas adjacent to and on all sides of the project as already constructed; and the extension of the drainage system which may become necessary as supplemental construction in behalf of the water users under the provisions of the reclamation extension act.

SUMMARY OF GENERAL DATA FOR TRUCKEE-CARSON PROJECT TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is complete		200,000
Public land entered to end of fiscal year	20,422	
Public land open to entry at end of fiscal year	4,211	
Public land withdrawn at end of fiscal year	94,887	
State land	215	
Indian land	4,640	
Private land	75,625	
Acreage service could have supplied season of 1916		70,915
Addition in fiscal year 1917		7,008
Estimated addition in fiscal year 1918		10,000
Estimated acreage service can supply July 1, 1918		87,923
Acreage actually irrigated, season of 1916		39,449
Acreage cropped under irrigation, season of 1916		38,249
Crops:		
Value of irrigated crops, season of 1916		$791,446.00
Value of irrigated crops per acre cropped		[1] $30.18
Finances:		
Gross construction cost to end of fiscal year		$6,035,831.96
Per cent complete at end of fiscal year		63.5
Appropriated for fiscal year 1918, total		$795,000.00
Allotment for construction, fiscal year 1918		$441,000.00
Estimated per cent complete, June 30, 1918		67.5
Proposed appropriation, fiscal year 1919, for construction		$735,000.00
Estimated gross construction expenditures to June 30, 1919		$7,211,831.96
Estimated per cent complete, June 30, 1919		74
Announced construction charges per acre		$22, $30, $60
Appropriation, fiscal year 1917		[2] $391,185.30
Expenditures during fiscal year, chargeable to 1917 appropriation:		
Disbursements and transfers	$106,368.15	
Registered liabilities chargeable to 1917 appropriation	$33,990.21	
		$140,358.36
Unencumbered balance July 1, 1917		$250,826.94

[1] Excluding wild-grass pasture and other fields not in full production.

[2] Includes balance of 1916 appropriation and refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

Repayments:		
Construction charges—		
Accrued to end of fiscal year		$320,337.97
Collected to end of fiscal year		$315,837.98
Uncollected at end of fiscal year		$4,499.99
Operation and maintenance charges (public notice)—		
Accrued to end of fiscal year		$257,270.59
Collected to end of fiscal year		$241,239.95
Uncollected at end of fiscal year		$16,030.64
Water-rental charges—		
Accrued to end of fiscal year		$6,478.74
Collected to end of fiscal year		$6,446.74
Uncollected at end of fiscal year		$32.00
Power earnings—		
Accrued to end of fiscal year		$43,777.81
Collected to end of fiscal year		$43,461.07
Uncollected at end of fiscal year		$316.74
Drainage:		
Estimated acreage damaged by seepage to end of fiscal year		11,000
Miles of drains built to end of fiscal year—		
Open	[1] 180.28	
Closed	3.99	
		184.27
Estimated acreage protected by drains built to end of fiscal year		11,000
Estimated acreage to be protected by authorized system		16,000
Cost of drainage works to end of fiscal year		$302,029.37

CONSTRUCTION DURING FISCAL YEAR.

Lateral construction.—The construction of several small laterals, including necessary structures and involving the removal of about 8,500 cubic yards of material, was completed. This lateral construction was for the service of second unit lands and also for lands already under water-right application. Excavation was done by teams.

Drainage construction.—During December, 1916, construction of the "BAD" drain in district 3 was accomplished. This drain was excavated to connect the "B" drain, which was deepened and cleaned, also, during December, with the deep "AD" drain. The removal of about 5,700 cubic yards of material and the placing of one redwood timber structure under the "BR" lateral were necessary in this work.

Excavation of the Harmon drain in the Stillwater district was commenced on May 14, and at the end of the fiscal year about 21,000 cubic yards of material had been removed and two redwood timber culverts placed under irrigation laterals.

Construction of the Harmon drain was undertaken for the relief of Piute Indian and other lands. A Monighan dragline excavator with one cubic yard bucket was used on all drainage construction work done during the year. Drains were of the deep open-cut type. Drainage investigations over the entire project, including test well borings, topographic surveys, and preliminary drain surveys, were commenced in October, 1916, and continued throughout the year.

On June 28, 1917, the director and chief engineer authorized the construction of a system of drains in the Fernley district, to be constructed and paid for under supplemental construction.

[1] Includes 9.5 miles of deep open drains, remainder being surface drains.

Miscellaneous.—During July, 1916, a photographic survey was made of the shore line of Lake Tahoe in order to show the actual effect of the highest lake elevation for the season, namely 6,229.80 feet. The photographs, in addition to topographic shore line surveys made during the year, were used in negotiations between the United States and representatives of owners of Lake Tahoe riparian shore lands.

One mile of new telephone line was constructed in the Stillwater district.

Ditch tender's house in the Stillwater district and gate tender's station and boathouse at Lake Tahoe were completed.

During May, 1917, the Government purchased two Holt 75-horsepower caterpillar tractors with land-leveling equipment, and on May 25 commenced work on the preparation of a 1,400-acre tract of Government land in district 3, north of Carson Lake. This area is to be subdivided into farm units and the cost of preparation of each unit will be added to the construction charge.

Upon the request of the Fernley Valley Water Users' Association plans and estimates were prepared for the construction of a proposed system of pipe lines to divert water from the Truckee Canal and to supply domestic and stock water to settlers in the Fernley district. Such an arrangement would permit the drying up of ditches during the winter which would allow cleaning work to be done and would tend to lower the ground water. It is proposed to pay for this work under supplemental construction.

SEEPAGE AND DRAINAGE.

The increasing number of requests each year from entrymen for temporary reductions of charges due to irrigable lands having become seeped or alkalied, together with the apparent rising underground water table, has well established the need over the greater portion of the project for an adequate deep drainage system. The present lack of such a complete system, coupled with improper methods of irrigation, has produced a condition which amounts practically to an emergency.

Results obtained from the few deep open-cut drains already constructed on the project have demonstrated their utility and necessity.

Considerable project agitation during the year resulted in an amendment to the Nevada irrigation district law, under which probably the most important improvement considered was the need and means of obtaining drainage. Early in the fiscal year 1918 an attempt will be made by project water users to vote in favor of the formation of the Truckee-Carson irrigation district, after which time and as soon as possible a project drainage system will be constructed.

ECONOMIES OF GOVERNMENT WORK.

The preparation of land for cultivation and irrigation in advance of settlement promises to demonstrate the economy of Government work along this line. The fact that land prepared by the Government, at the time of entry by the settler, is in readiness for full cultivation and promises immediate returns gives it an advantage over that prepared by the ordinary settler's methods where full cultivation is not obtained for years and returns, which allow of the purchase

of needed improvements, are slow. Under such methods the economic advantage of an entire producing unit is lost. The preparation of land by the Government can be done on such a scale that some features of cost, which would be great to the individual of small means, can almost be eliminated when a large area of ready prepared land is considered. As compared with the power equipment in use by the Government the use of stock for land preparation is not economical where the high price of feed and the smaller amount of prepared land is considered.

BOARD MEETINGS.

Date.	Topic.	Personnel.
July 22 and 23, 1916.	Regulation of Lake Tahoe...	J. F. Truesdell, D. W. Cole, F. G. Hough, and representatives of Lake Tahoe Protective Association.
Aug. 4 and 5, 1916...	....do.....	Federal Judge Van Fleet, United States attorneys in charge of Lake Tahoe negotiations, project manager, representatives of Lake Tahoe Protective Association.
Sept. 29, 1916.....	Project drainage.....	Chief of construction, drainage engineer, project manager.
Feb. 1, 1917.....	Irrigation district formation.	Representatives of water users, District Counsel B. E. Stoutemyer, project manager.
Mar. 13, 1917.....	Project drainage.....	D. C. Henny, consulting engineer; D. W. Cole, senior engineer; F. G. Hough, project manager.
May 2, 1917.....	Increase of project crop production.	Dr. Elwood Mead, University of Nevada officials, project manager.
May 7 to 12, 1917....	Truckee River water-right adjudication.	Attorneys J. F. Truesdell, O. P. Morton, Ethelbert Ward; Engineer E. P. Osgood.
May 8, 1917.....	Regulation of Lake Tahoe...	J. F. Truesdell, D. W. Cole, and representatives of Lake Tahoe Protective Association.

OPERATION AND MAINTENANCE.

Water supply.—The irrigation season of 1916 found the project with an abundant supply of water. Lake Tahoe reached its maximum elevation for the year of 6,229.80 feet on July 14, which indicated a storage of 696,000 acre-feet for irrigation and power purposes. Lahontan Reservoir reached its maximum elevation of 4,146.38 feet on July 11 with a storage of 155,900 acre-feet.

Snow accumulation during the winter of 1916–17 reached 160 inches in depth at Summit, Cal., on the headwaters of the Truckee River, and there were corresponding accumulations elsewhere on the watersheds of both the Truckee and Carson Rivers. Lake Tahoe reached an elevation of 6,229.69 feet on June 30, 1917, and Lahontan Reservoir 4,153.35 feet on the same date, representing a total storage of 682,800 acre-feet for the former and 198,725 acre-feet for the latter.

Use of water.—During the 1916 irrigation season 264,186 acre-feet were turned into the main distributing systems, of which amount 54,430 acre-feet were wasted back to the rivers through spillways or drains, 78,964 acre-feet were lost in transmission, and 130,793 acre-feet delivered to farms. Of the amount delivered to farms 94,685 acre-feet were distributed to water users paying operation and maintenance charges and 36,108 acre-feet were delivered to lands claiming unsettled vested water right, paying no operation and maintenance charges. During 1916 water was delivered to 39,449 acres with a net duty of 3.316 feet. This net duty compares favorably with the 1915 record of 2.94 feet and 1914 record of 3.28 feet.

The main Truckee Canal was operated continuously for the irrigation of 3,739 acres in the Fernley and Northam districts and for

power development with incidental carriage of surplus water to Lahontan Reservoir.

The V and T canals which divert from the Carson River below the Lahontan Reservoir were operated to serve 35,710 acres of irrigated lands under the extension lateral system which centers around Fallon. The operation of the system was in charge of one water master at Fallon, assisted by one hydrographer and 12 ditch tenders, who by means of systematic methods of water delivery were enabled to keep the individual needs of the farmers well supplied.

Maintenance work.—The project canals and laterals were maintained throughout the year without unusual incident, using generally the same methods and plan of organization as in previous years. A general foreman directed all maintenance work. A very large proportion of the work was done by the employment of men and teams from farms located near the work and by the regular ditch-rider force whose time during the winter months is available for this work. A small regular maintenance force of men and teams was employed throughout the year, working out from the headquarters at Fallon the greater part of the time.

Two breaks occurred in June, 1917, in the T line canal near the diversion dam, keeping the water out of the canal for four days. These were the only main canal breaks during the year.

A 1-cubic-yard gasoline drag-line excavator was used in cleaning and deepening a short stretch of drain and in cleaning about 2 miles of the S2 canal.

Several hundred feet of tile drains were laid in the bank of the Truckee Canal where the break occurred in June, 1916, to protect the bank by carrying off the seepage flow.

In fixing the operation and maintenance charge for 1917, by public notice of March 22, 1917, an effort was made to establish rates which would encourage economy in the use of water. During 1915 and 1916 the rates were: Minimum, 90 cents per acre, 1 acre-foot allowed and 10 cents per acre-foot for all additional water. The new rates for the major portion of the project for 1917 are: Minimum charge, 80 cents, 1½ acre-feet allowed, and for the first, second, and each subsequent acre-foot per acre additional the charges are 20 cents, 30 cents, and 50 cents, respectively.

Historical review, Truckee-Carson project.

Item.	1912	1913	1914	1915	1916	To June 30, 1917.
Acreage for which service was prepared to supply water	52,039	52,039	52,039	65,000	70,915	83,942
Acreage irrigated	36,620	43,075	43,075	40,295	39,449	41,000
Number of farms irrigated	497	494	494	540	584	590
Miles of canal operated	294	295	295	300	305	310
Water diverted (acre-feet)	170,763	186,175	225,000	233,693	264,186	.....
Water delivered to land (acre-feet)	62,707	69,798	94,730	118,233	130,793	.....
Per acre of land irrigated (acre-feet)	2.50	2.26	3.28	2.94	3.32	.....

SETTLEMENT.

During the fall of 1916 and the spring of 1917 there was considerable activity on the part of land seekers. A great many inquiries were received and answered by the project office and many

visitors investigated local opportunities. There was more movement in local real estate than for several years past and there were a large number of transfers, some of them involving higher prices than have ever before been paid for land within the project. Many of them were of such proportions as to indicate a very high producing value for our best land when fully improved.

Only one additional farm unit was opened to entry during the year. From July 1, 1916, to June 30, 1917, there were 26 homestead entries, covering 1,473 acres of irrigable land and 7 applications for a total of 453 acres of land in private ownership.

Development in the city of Fallon kept pace with the general activity on the farms. The influx of population in connection with the revival of the sugar-beet industry and other developments caused a shortage of houses and stimulated building, with the result that a number of new homes and cottages for rent have been added to the town. Preparations were completed for the opening on July 1 of a second bank, known as the Bank of Fallon. A number of other new business houses were established during the year. The Fallon post office was advanced from the third to the second class early in 1917. The city's population on June 30, 1917, was variously estimated at from 1,400 to 1,800.

Settlement data, Truckee-Carson project.

Item.	1912	1913	1914	1915	1916	1917
Total number of farms on project	497	494	494	540	584	590
Population		1,635	1,635	1,867	2,022	2,100
Number of irrigated farms		494	494	540	584	590
Operated by owners or managers		439	439	480	514	520
Operated by tenants		55	55	60	70	70
Population		1,635	1,635	1,867	2,022	2,050
Number of towns	4	4	4	4	4	4
Population		1,250	1,250	1,400	1,360	1,600
Total population in towns and on farms		2,885	2,885	3,267	3,382	3,700
Number of public schools	18	18	19	20	18	18
Number of churches	7	8	8	8	9	9
Number of banks	1	1	1	1	1	2
Total capital stock	$100,000	$100,000	$100,000	$100,000	$100,000	$130,000
Total amount of deposits	$260,000	$300,000	$350,000	$300,000	$342,000	$371,240
Total number of depositors	550	600	650	700	700	775

PRINCIPAL CROPS.

In 1916 the alfalfa crop comprised about three-fourths in value of all crops produced. The prices received by the farmers ranged from $6 per ton in the stack to $30 per ton baled and on board the cars. The estimated average price received was $9 per ton. There was a marked increase in the value of the wheat and barley crops over previous years, brought about largely by the establishment and successful operation of a flour mill at Fallon. The general advance in prices of all foodstuffs greatly stimulated land preparation during the fall of 1916, with the result that a larger additional area of new land than usual is now producing.

The local beet-sugar factory was taken over by the Nevada-Utah Sugar Co. and an active campaign for beet acreage was conducted among the farmers during the fall of 1916. In June, 1917, the sugar company reported about 4,400 acres of beets on the project, generally in excellent condition. The only drawback has been a shortage of labor for thining and cultivating.

Crop report, Truckee-Carson project, Nevada, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa	19,541	Ton	61,756	3.16	$9.00	$555,804	$28.00
Barley	1,658	Bushel	52,000	31.36	.96	49,920	30.00
Wheat	2,861	do	57,733	20.18	1.35	77,940	27.00
Oats	107	do	4,562	42.64	.64	2,920	27.00
Potatoes	177	do	29,400	166.10	1.20	35,280	199.00
Garden and miscellaneous	513					28,196	55.00
Hay (except above)	1,310	Ton	1,057	.81	7.69	8,128	6.21
Alfalfa (planted 1916)	1,904	do	339	.18	9.00	3,051	1.60
Pasture alfalfa after cutting						16,878	
Pasture (wild grass)	10,872					13,329	1.23
Less duplicated areas	694						
Total cropped	38,249	Total and average				791,446	[1] 20.70

		Areas.	Acres.	Farms.	Per cent of project.
Acreage irrigated without crop	1,200	Total irrigable area farms reported	62,284	584	30.24
		Total irrigated area farms reported	39,449	584	19.15
Total irrigated	39,449	Total cropped area farms reported	38,249	584	18.56

[1] $30.18, excluding wild-grass pasture and other fields not in full production.

WATER USERS' ACTIVITIES.

A strong movement of the project water users to organize an irrigation district under the State law gained considerable headway during the year, and during June, 1917, a petition for the organization of the district was being generally signed. This movement was started early in 1916 by the South Side Water Users' Association, an informal organization composed of water users residing in the area south of Fallon. Amendments to the State law were enacted by the legislature in March on recommendation of the project water users. The proposed district will include the entire present settled portion of the project and the plans provide for future extensions of its boundaries as the project develops, so that ultimately the entire project will be in the district.

PUBLIC NOTICES AND ORDERS.

PUBLIC NOTICE, MARCH 10, 1917.

1. In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplementary thereto, and particularly the reclamation extension act of August 13, 1914 (38 Stat., 686), public notice for certain lands of the Truckee-Carson project, Nevada, is hereby given as follows:

2. *Lands for which water will be furnished.*—Water will be furnished under said project in the irrigation season of 1917, and thereafter, for the irrigable lands of the NE. ¼ NW. ¼, section 20, township 19 north, range 29 east, M. D. M., the same being farm unit D of said section. An amended farm-unit plat of said township showing said farm unit was approved by the Secretary of the Interior on March 10, 1917, and is on file at the local land office at Carson City, Nev., and

at the office of the project manager, United States Reclamation Service, at Fallon, Nev.

3. *When and how to make entry for public land.*—Homestead entries for the farm unit shown on said plat embracing public lands of the United States may be made beginning March 28, 1917, at 9 o'clock a. m., at said local land office at Carson City, Nev. Every person desiring to acquire said public land must execute a homestead application subject to the provisions of the reclamation law in manner required by law, which, with the required fees and commissions, accompanied by certificate of the project manager as to the filing of water-right application and payment of water-right charges as hereinafter provided, may be presented to said local land office, in person, by mail, or otherwise, during a period of five days prior to the opening, to wit: On and from March 23, 1917, to and including 9 o'clock a. m., March 28, 1917. Applications presented after said period of five days will be filed and noted in the order of their receipt. Any application not based on a prior settlement right will be subject to valid settlement claims asserted in the manner required by law.

4. *Simultaneous filings for public land.*—Applications reaching said local land office within the said period of five days will be held and treated as simultaneously filed, and the register and receiver will dispose of them as follows:

(*a*) Where there is no conflict the application will be allowed, irrespective of whether settlement is alleged.

(*b*) In case of conflicting applications and only one of the applicants alleges prior settlement, his application will be allowed and the others rejected.

(*c*) If two or more conflicting applications, each containing allegations of prior settlement, are received, a hearing, restricted to those alleging such right, will be ordered to determine the priority of right.

(*d*) Where there are conflicting applications in which no one of the several applicants claims prior settlement the register and receiver will write on cards the names of the several applicants, and each of these cards will be placed in an envelope upon which there is no distinctive or identifying mark, and at 2 o'clock p. m., on the date of opening to entry, if practicable (if not, at the same hour one day later), after all the envelopes containing the names of the several applicants shall have been thoroughly mixed in the presence of such persons as may desire to be present, they will be drawn and numbered in order. The cards as drawn and numbered will be securely fastened to the applications of the respective persons, and the applications will be allowed in such order. Applications conflicting in whole with those previously allowed will be rejected in the usual manner.

5. *Warning against unlawful settlement upon public land.*—No person will be permitted to gain or exercise any right whatever under any settlement or occupation of any of said public lands, begun at or prior to 9 a. m., March 28, 1917. *Provided, however*, That this shall not affect any valid existing right obtained by settlement or entry while the land was subject thereto.

6. *Limit of area for which water right may be secured.*—The limit of area per entry representing the acreage which, in the opinion of the Secretary of the Interior, may be reasonably required for the support of a family upon such lands, is fixed as shown upon the said plat.

7. *Application for water right.*—All water-right applications must be made to the project manager, United States Reclamation Service, Fallon, Nev., upon forms provided for that purpose. Every application must be accompanied by the proper initial water-right payment, which will be accepted by the project manager in the form of New York draft or money order payable to special fiscal agent, United States Reclamation Service, Fallon, Nev., or in currency. Each water-right application must be for the specific farm unit, and more than one person may make such application for the unit. A certificate of filing will be issued each applicant by the project manager. Filing of water-right application and issuance of certificate give no preference right to entry on public lands. Only when the project manager is notified by the local land office that entry has been allowed, will acceptance of the water-right application be endorsed thereon. Whereupon all other water-right applications affecting the farm unit with payments made, will be returned to the respective applicants, upon surrender by them of the certificates of filing issued by the project manager.

8. *Classes of charges for water rights.*—The water-right charges are of two kinds, to wit: (1) A charge against each irrigable acre to cover cost of construction of the irrigation system, termed the construction charge; and (2) an annual charge against each irrigable acre to cover cost of operation and maintenance of the system, termed the operation and maintenance charge.

9. *Construction charge.*—The construction charge shall be $60 per acre of irrigable land, payable as follows: Five per centum of the construction charge shall be paid at the time of filing water-right application, and the remainder of the construction charge shall be paid in 15 annual instalments, the first five of which shall each be 5 per centum and the remainder each 7 per centum of the total construction charge. The first of said 15 annual instalments shall become due and payable December 1 of the fifth calendar year after the initial instalment, and subsequent instalments shall become due and payable on December 1 of each calendar year thereafter.

10. *Increased construction charge in certain cases.*—In all cases where water-right application for lands in private ownership or for lands under entries not subject to the reclamation act, shall not be made within one year from the date of this notice, the construction charge for such land shall be increased 5 per centum each year until such application is made and an initial instalment is paid.

11. *Advance payment of construction charge permissible.*—Any water-right applicant may, at his option, pay in advance the whole or any part of the construction charge owing by him within any shorter period than that prescribed by this notice.

12. *Operation and maintenance charge.*—The operation and maintenance charge for the irrigation season of 1917 and thereafter until further notice shall be of the same amount as for other like lands under the said project. Such charge will be due and payable on March 1 of each year for the preceding irrigation season.

13. *Place and manner of payment of water charges.*—All water-right charges must be paid at the office of the United States Reclamation Service at Fallon, Nev., in cash, or by New York draft, or money

order, payable to the special fiscal agent, United States Reclamation Service.

14. *Distributing system.*—The entryman upon said farm unit shall, at his own expense, from a point on the Government canal near the northeast corner of SE. ¼ SE. ¼ section 19, township 19 N., range 29 E., M. D. M., operate and maintain the necessary canal and distributing system and deliver water to said farm unit. In case the said canal and distributing system are not operated and maintained in proper condition by the entryman or his successor in interest thereof, the United States may do so and charge the cost thereof to such entryman or his successor in interest, as additional operation and maintenance charges. The proper officers and employees of the United States and its successors, shall at all times have the right of access to said farm unit whenever, in the judgment of the officer or employee in charge of said project, it is necessary for them to exercise said control to secure such delivery of water.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

PUBLIC NOTICE, MARCH 22, 1917.

1. *Annual operation and maintenance charges.*—In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and of acts amendatory thereof and supplementary thereto, and particularly of the reclamation extension act of August 13, 1914 (38 Stat., 686), announcement is hereby made that the annual operation and maintenance charges for the irrigation season of 1917 and thereafter until further notice against all lands of the Truckee-Carson Project, Nevada, under public notice, shall be as follows: A minimum charge of 80 cents per irrigable acre whether water is used thereon or not, which charge will permit the delivery of not to exceed 3 acre-feet of water per irrigable acre upon lands of the Fernley and Hazen benches shown upon a map on file in the project office, and not to exceed 1½ acre-feet per irrigable acre upon the other lands of the project; and that additional water up to a limit of 1 acre-foot per irrigable acre will be furnished for 20 cents per acre-foot; and that further additional water up to a limit of 1 acre-foot per irrigable acre will be furnished for 30 cents per acre-foot; and all further quantities for 50 cents per acre-foot.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix, p. 502.]

Feature costs of Truckee-Carson project to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys:		
Examination, general		$171,235.57
Lahontan Valley	$382.69	698.75
Reno Valley	5,774.60	23,523.25
Soda Lakes	12.87	5,860.79
Stream gauging	812.87	24,480.72
Upper Carson Valley	333.48	8,374.95
Lake Tahoe investigations	1,834.03	1,834.03
Drainage investigations	17,434.69	17,434.69
	26,585.23	253,442.75
Storage system:		
Lake Tahoe Dam and Reservoir	2,266.72	161,019.15
Lahontan Dam and Reservoir	[1] 22,808.33	1,432,101.39
	[1] 20,541.61	1,593,120.54
Canal system:		
Main canals		448,616.00
Carson Diversion Dam	52.31	91,776.84
Power-house drop, V line		62,487.63
Truckee Canal	17.33	1,583,827.65
Truckee concrete chute		29,095.60
Lahontan bench canal, section 1		20,584.29
	69.64	2,236,388.01
Lateral system:		
Truckee Canal laterals	628.76	87,039.16
V-line laterals	196.68	196.68
T-line laterals	1,161.01	127,210.01
S-line laterals	401.60	283,126.60
AA-line laterals	2,666.91	303,644.74
D-line laterals	68.51	110,672.64
L-line laterals	232.96	176,472.81
Primary laterals (1905 and 1906)		48,888.18
	5,356.43	1,137,250.82
Drainage system:		
District No. 1		141,002.04
District No. 2		22,092.06
District No. 3		31,330.04
District No. 4		5,637.30
District No. 5		44,287.70
Drainage investigations		3,517.90
Carson Lake drain		3,707.85
Inman mill right		8,038.46
Deep-drainage system		31,397.75
Harmon drain	5,096.30	5,096.30
A-D drain extension	26.10	5,005.87
B-A-D drain	713.74	916.10
	5,836.14	302,029.37
Flood protection: Carson River channel		131,821.37
Power system:		
Lahontan power plant	13,687.40	136,134.20
Commercial power system		26,346.65
	13,687.40	162,480.85
Farm units:		
Farm-unit subdivision, miscellaneous		3,890.19
Property and structure, maps		4,233.36
Irrigable-land surveys, districts 1, 2, 3, 4, 5, and 7	921.75	10,078.31
Leveling farm lands	6,643.51	6,643.51
	7,565.26	24,845.37

[1] Deduct.

Feature costs of Truckee-Carson project to June 30, 1917—Continued.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Permanent improvements:		
Experimental farm		$7,008.44
Headquarters buildings	$1,655.05	15,556.26
Ditch tenders' houses	4,477.57	22,517.35
Land	1,689.28	64,586.10
	7,821.90	109,698.15
Telephone system	229.90	42,377.85
Plant accounts	15,904.75	40,353.95
Operation and maintenance charges transferred to and compounded with construction charges		2,022.93
Gross construction cost to June 30, 1917	62,515.04	6,035,831.96
Less revenues earned during construction period:		
Rental of buildings		17,684.11
Rental of grazing and farming lands	2,093.74	20,013.56
Contractors' freight refunds		412.07
Forfeitures by defaulting bidders and contractors		499.95
Profit on mess-house operations	[1] 16.82	17,739.31
Profit on mercantile-store operations		17,825.35
Profit on hospital operations	[1] 1,084.82	[1] 2,462.79
	992.10	71,711.56
Net cost of construction of project to June 30, 1917		5,964,120.40

[1] Deduct.

Statement of cost by calendar years, Truckee-Carson project.

Year ending Dec. 31—	Construction.	Operation and maintenance under public notice.	Total cost.
1907	$3,722,316.15	$90,431.57	$3,812,747.72
1908	17,221.04	60,177.33	77,398.37
1909	[1] 976.89	113,002.14	112,025.25
1910	80,572.19	39,188.87	119,761.06
1911	365,373.25	48,325.21	413,698.46
1912	668,324.06	[1] 108,989.11	559,334.95
1913	467,588.32	53,331.13	520,919.45
1914	456,192.82	45,902.61	502,095.43
1915	173,952.21	49,107.20	223,059.41
1916	20,803.36	49,797.38	70,600.74
January to June 30, 1917	22,088.57	8,931.85	31,020.42
Plant accounts and operation and maintenance added to construction	42,376.88		42,376.88
Total	6,035,831.96	449,206.18	6,485,038.14

[1] Deduct.

Statement of cost by fiscal years, Truckee-Carson project.

Year ending June 30—	Construction.	Operation and maintenance under public notice.	Total cost.
1907	$3,573,134.35	$67,105.07	$3,640,239.42
1908	242,801.86	57,716.00	300,517.86
1909	[1] 107,049.46	24,056.40	17,006.94
1910	69,945.22	34,870.69	104,815.91
1911	138,866.51	47,123.04	185,989.55
1912	671,617.45	[1] 10,122.29	561,495.16
1913	454,587.53	52,354.98	506,942.51
1914	514,930.03	44,610.78	559,540.81
1915	400,371.22	46,313.22	446,684.44
1916	[1] 12,359.92	51,996.84	39,636.92
1917	62,515.04	33,181.45	95,696.49
Plant accounts and operation and maintenance added to construction	26,472.13		26,472.13
Total	6,035,831.96	449,206.18	6,485,038.14

[1] Deduct.

Estimated cost of contemplated work, Truckee-Carson project, fiscal year 1918.

Features.	Estimated cost during fiscal year 1918.	
	Subfeature.	Principal feature.
Examination and surveys:		
Truckee River water-right adjudication	$4,000	
Cooperative investigation, upper Carson	1,000	
Stream gaging (outside of operation and maintenance)	500	
		$5,500
Storage system:		
Lake Tahoe, rights and property	60,000	
Channel improvement on Truckee River	30,000	
Additional storage, Truckee River	150,000	
		240,000
Canal system:		
Check in Truckee Canal	3,000	
Construction of Lahontan Bench Canal	33,000	
		36,000
Lateral system:		
Survey of lateral extensions	4,000	
Construction of lateral extensions	67,000	
		71,000
Drainage system:		
Surveys and estimates	4,000	
Construction of Fernley drains	21,000	
Completion of Harmon drain	6,000	
		31,000
Irrigable lands (farm units):		
Preparation of Government land	50,000	
Seeped and alkalied area surveys	1,000	
Irrigable area surveys and farm units	4,000	
Office work in connection with farm units and farm-unit plats	1,300	
		55,300
Real estate (permanent improvements and land):		
Addition to Fallon office and Lahontan bench ditch rider's station		2,700
Telephone system		2,500
Operation and maintenance under public notice		75,000
		519,000

NEW MEXICO, CARLSBAD PROJECT.

L. E. Foster, project manager, Carlsbad, N. Mex.

LOCATION.

County: Eddy.
Townships: 18 to 24 S., Rs. 25 to 29 E., New Mexico meridian.
Railroad: Atchison, Topeka & Santa Fe System.
Railroad stations and estimated population January 1, 1917: Carlsbad, 3,000; Otis, 25; Loving, 200; Malaga, 75.

WATER SUPPLY.

Source of water supply: Pecos River.
Area of drainage basin: 22,000 square miles.
Annual run-off in acre-feet of Pecos River at Carlsbad and Dayton (22,000 square miles) 1899 to 1916: Maximum, 912,000; minimum, 148,000; mean, 319,000.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service is prepared to supply water, season of 1917: 24,775 acres.
Area under water-right applications, season of 1917: 23,078 acres.
Length of irrigating season: From March to November and two weeks in winter, 260 days.
Average elevation of irrigable area: 3,100 feet above sea level.
Rainfall on irrigable area: 1901–1916, average 15.20 inches; calendar year 1916, 19.87 inches.
Range of temperature on irrigable area: −5° to 110° F.
Character of soil of irrigable area: Pecos sandy loam with large lime content.
Principal products: Alfalfa, cotton, grain crops, melons, peaches, pears, and miscellaneous fruits.
Principal markets: Carlsbad, N. Mex.; Denver, Colo.; Chicago, Ill., Kansas City, Mo.; Texas cities; New York, N. Y.

LANDS OPENED FOR IRRIGATION.

Dates of public notices: December 17, 1907; November 30, 1908; June 2, November 17, 1909; October 7, 1910; March 3, 1911; February 17, 1912; March 2, April 10, 1915; February 24, September 2, 1916; March 9, 1917.
Location of lands opened: Ts. 21, 22, 23, and 24 S., Rs. 26, 27, 28, and 29 E., New Mexico meridian.
Irrigable lands opened: 24,775 acres; State lands 1,220 acres; private 23,389 acres; public 166 acres.
Duty of water: 2.43 acre-feet per acre per annum at the farm, 1916.
Building charge per acre of irrigable land: $31, $45, $55, and $60.
Annual operation and maintenance charges on graduated scale according to use. For 1916, first acre-foot, $1.25; second acre-foot, 15 cents; third acre-foot, 25 cents; fourth acre-foot, 40 cents; fifth acre-foot, 60 cents; additional acre-feet, 75 cents per acre-foot. For 1917, first acre-foot, 90 cents; second acre-foot, 15 cents; third acre-foot, 15 cents; fourth acre-foot, 50 cents; additional acre-feet, 75 cents per acre-foot.

CHRONOLOGICAL SUMMARY.

Reconnoissance made and preliminary surveys begun in 1904.
Construction recommended by board of engineers August 31, 1905.
Construction authorized by Secretary February 24, 1906.
Canal system of Pecos Irrigation Co. purchased February, 1906.
First irrigation by Reclamation Service, season 1907.
Construction completed at Avalon diversion, 1912.
Project 81.5 per cent completed June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the Carlsbad project provides for the storage of water in Lake McMillan, on Pecos River, near Lakewood, N. Mex., and in a storage and distributing reservoir on the same river near Carlsbad, N. Mex., controlled by Avalon Dam; and the diversion of water from Avalon Reservoir into a canal system, watering lands on both sides of Pecos River, in the vicinity of Carlsbad. The United States claims all waste, seepage, spring, and percolating water arising within the project and proposes to use such water in connection therewith.

The major construction features of the project were completed in 1912, the principal of which are: The Avalon Dam, which has a concrete core wall; McMillan, an earth and rock fill dam, which was built by private capital, antedating Government control; a concrete flume spanning the Pecos River, with 4 arches of 100 feet each; a reinforced concrete siphon, under Dark Canyon, 6 feet in diameter, originally 400 feet long, which was lengthened to 600 feet in 1916; about 50 miles of canals and laterals (exclusive of sublaterals and ditches); a concrete head-gate structure at each of the dams, and two spillway tunnels driven through rock, each 21 feet in diameter, lined with concrete, aggregating 200 feet in length, equipped with heavy cylindrical gates operated by turbines (replacing concrete spillway equipped with wooden emergency gates, spillway having been closed with concrete); and a reinforced concrete circular spillway 393 feet long. All check gates, spillways, and head-gate structures on the canals and all turnouts on the laterals are of concrete construction.

SUMMARY OF GENERAL DATA FOR CARLSBAD PROJECT TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is complete		24,775
Public land entered to end of fiscal year	166	
State land	1,220	
Private land	23,389	
Acreage service could have supplied season of 1916		24,775
Estimated acreage service can supply July 1, 1918		24,775
Acreage actually irrigated, season of 1916		16,600
Acreage cropped under irrigation, season of 1916		14,500
Crops:		
Value of irrigated crops, season of 1916		$416,041.00
Value of irrigated crops, per acre cropped		28.70
Finances:		
Gross construction cost to end of fiscal year		$1,253,580.22
Per cent complete at end of fiscal year		81.5
Appropriated for fiscal year 1918, total		$64,000.00
Allotment for construction, fiscal year 1918		$36,000.00
Estimated per cent complete, June 30, 1918		84
Proposed appropriation, fiscal year 1919, for construction		$48,000.00
Estimated gross construction expenditures to June 30, 1919		$1,337,580.22
Estimated per cent complete, June 30, 1919		87
Announced construction charges per acre		$31; $45; $55; $60
Appropriation, fiscal year 1917		[1] $352,871.36
Expenditures during fiscal year, chargeable to 1917 appropriation—		
Disbursements	$197,372.02	
Transfers	83.99	
	$197,456.01	
Registered liabilities chargeable to 1917 appropriation	15,000.00	
		212,456.01
Unencumbered balance July 1, 1917		140,415.35

[1] Includes balance of 1916 appropriation and refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

Repayments:		
Construction charges—		
Accrued to end of fiscal year		$174,056.77
Collected to end of fiscal year		159,359.12
Uncollected at end of fiscal year		14,697.65
Operation and maintenance charges (public notice)—		
Accrued to end of fiscal year		184,810.43
Collected to end of fiscal year		161,568.33
Uncollected at end of fiscal year		23,242.10
Water-rental charges—		
Accrued to end of fiscal year		14,033.63
Collected to end of fiscal year		13,756.28
Uncollected at end of fiscal year		277.35
Drainage:		
Estimated acreage damaged by seepage to end of fiscal year		3,061
Miles of drains built to end of fiscal year—		
Open	9.01	
Closed	3.93	
		12.94
Estimated acreage protected by drians built to end of fiscal year		2,769
Estimated acreage to be protected by authorized system		5,000
Cost of drainage works to end of fiscal year		$91,019.92

CONSTRUCTION DURING FISCAL YEAR.

McMillan Reservoir.—As a result of the flood of April, 1915, a description of which was given in the fifteenth annual report, it became necessary to provide more adequate spillways at McMillan. Reservoir surveys and investigations on which plans for the work were based were completed during the late summer season.

Specifications covering earthwork for the spillways were issued under date of July 6, 1916. John Mulligan, a contractor of El Paso, was the successful bidder, but he concluded that his bid was too low and forfeited his bond of $3,000. The work was then done by Government forces.

Briefly the spillway enlargement consists in the remodeling of two existing spillways into what is now known as spillway No. 1, capacity 22,000 second-feet, located about one-fourth mile northwest of the west end of the main dam; and spillway No. 2, capacity 12,500 second-feet, a little over one-fourth mile west of spillway No. 1.

Spillway No. 1, as reconstructed, consists of a concrete crest wall 1,400 feet long between concrete abutments. Subfeatures of spillway No. 1 are the channel, the dike, and the gorge, and serve the following purposes:

The channel provides grade and capacity to carry the overflow from the crest; the dike protects the Santa Fe Railroad from inundation and diverts the flow to the gorge. The gorge had to be excavated to provide necessary flowage capacity, which the original topography did not do.

Spillway No. 2 is a concrete lined channel leading from a crest 350 feet long. A subfeature of spillway No. 2 construction was the strengthening of the west embankment, by an addition of a 10-foot blanket of excavated material hauled from spillway No. 2. This enlargement

is carried from the west side of spillway No. 2, along the embankment to the west side of the old training dike, at one time the east wing of spillway No. 3, which was closed after the flood of April, 1915.

The building of these spillways involved the moving of 178,566 cubic yards of material and the placing of 4,806 cubic yards of concrete. Work on the spillways was begun and completed, including work on the east embankment, on May 26, 1917. The east embankment was raised 3 feet from elevation 3,273 to 3,276. The water slope of the new work was riprapped from 18 to 24 inches in thickness. About 9,700 cubic yards of material were placed and the cost was about $8,000.

Distributing system.—Construction work on the distributing system was confined to the extension of existing laterals to accommodate new land and the building of concrete farm turnouts to serve the same purpose.

Drainage system.—Open drain B in the Otis district was completed. This drain has an average depth of 10.5 feet, and is 12,625 feet long. Considerable rock was encountered in the construction of the drain and a great deal of water was developed therein. The total excavation amounted to 95,011 cubic yards; 7,550 lineal feet were excavated during the fiscal year ending June 30, 1917.

The drag line was moved to E drain, also located in the Otis area, after the completion of B drain; 9,280 lineal feet were excavated on this drain to the end of June, 1917. It was then within about 400 lineal feet of completion. Excavation was in class 1 material. The depth of the drain averages about 10 feet and considerable water was developed in building the drain.

C closed drain, also in the Otis area, was converted into an open drain to relieve an overflowed condition of the drain; 6,000 lineal feet of open ditch were thus constructed. Work was started and nearly completed on open ditch C, which was designed to relieve a small area tributary to the C drain. This drain is 2,420 feet long and averages 9 feet in depth.

SEEPAGE AND DRAINAGE.

Seepage conditions on lands tributary to completed drains and lined sections of canals and laterals, have greatly improved. Conditions have been extremely bad in the area tributary to the A, C, and E drains. Provisions for greater capacity of drains by converting closed to open drains and the building of new drains in this area have resulted in materially improving conditions this summer. Investigations have been carried on in the Loving area and plans have been completed to extend the D drain for several miles. Seepage is increasing in an area 4 miles southeast of Otis. Investigations have been started in this area, but no locations made.

OPERATION AND MAINTENANCE.

The spring of 1916 was late and crops started slowly. The first crop was practically killed by frost. The weather was dry until July 27, when heavy rains started and precipitation was heavy throughout August. Late summer rains caused an abundance of grass on the range. Water was turned into the system on March 16, 1916, and turned out on November 24, 1916. Water was out of the

canal from July 27 to August 7, and again near the end of August, on account of heavy rains. The supply of water for the season was large. The total run-off amounted to 415,000 acre-feet for the calendar year 1916. The run-off from the watershed from late fall until the end of the fiscal year 1917 was unusually low.

Maintenance work consisted mainly of routine cleaning of the distributary system. On account of excessive summer rains, weeds and Johnson grass grew faster than usual. A heavy rise in Black River at the end of July floated out of place 1,500 lineal feet of metal flume from the Black River Canal. The main canal banks at the Dark Canyon and Hackberry crossings were eroded to some extent by flood waters. Repairs were made promptly and there was no inconvenience on the farms. The total area in crops to June 30, 1917, amounted to 16,500 acres. About the same acreage was irrigated during 1916.

Historical review, Carlsbad project.

Item.	1911	1912	1913	1914	1915	1916
Acreage for which service was prepared to supply water	20,267	20,277	20,261	20,261	24,796	24,775
Acreage irrigated	14,853	13,509	14,260	12,740	13,470	16,600
Miles of canal operated	45	45	45	45	45	45
Water diverted (acre-feet)	85,100	85,086	86,560	87,900	79,530	[1] 415,100
Water delivered to land (acre-feet)	33,198	38,764	33,044	30,900	28,857	40,382
Per acre of land irrigated (acre-feet)	2.20	2.90	2.30	2.40	2.14	2.43

[1] Former years reported on basis of diversion at headgates.

SETTLEMENT.

Settlement by bona fide home builders has been very slow. The development by resident owners on the land has been steady, and farm operations have been greatly improved. The amount of land transferred amounted to several thousand acres, the sales being mainly of raw lands sold by large holders to local people.

Settlement data, Carlsbad project.

Item.	1912	1913	1914	1915	1916
Total number of farms on project	[1] 521	[1] 519	[1] 524	[1] 616	[1] 690
Population	675	940	950	950	634
Number of irrigated farms	345	362	362	390	455
Operated by owners or managers	[2] 145	[2] 224	[2] 240	[2] 280	[2] 167
Operated by tenants	[2] 200	[2] 138	[2] 122	[2] 110	[2] 83
Population	650	910	925	541	634
Number of towns	4	4	4	4	4
Population	3,000	3,100	3,200	3,000	3,300
Total population in towns and on farms	3,675	4,040	4,150	3,950	3,934
Number of public schools	7	7	7	7	7
Number of churches	8	8	8	8	8
Number of banks	2	2	2	2	3
Total capital stock	$80,000	$80,000	$80,000	$80,000	$225,000
Total amount of deposits			$547,000	$687,000	$1,243,316
Total number of depositors			1,400	1,484	2,138

[1] Water-right applicants.

[2] Many farms were operated by 1 man.

PRINCIPAL CROPS.

As usual, the largest crop in point of acreage was alfalfa. The average yield of hay was three-tenths of a ton lower than the previous season. This was due principally to the larger acreage of

alfalfa left for seed. The cotton crop was second in importance in point of acreage, as well as total money value. The avearge gross value per acre for seed and lint was $44.41. The acreage yield of this important crop was lower than usual, on account of the depredation of worms, which cut the yield fully one-half on many fields and stripped fields of nearly the entire crops. The price for seed and lint was high.

The small grain crop was harvested on the project. The wheat crop was milled at Loving and the flour marketed locally. The average gross value for all crops was about $7 per acre more than for the previous season and the total money value of all crops exceeded that of 1915 by $170,000.

Crop report, Carlsbad project, New Mexico, year of 1916.

Crop.	Area. (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average, per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa	6,820	Ton	12,343	1.8	11.37	$140,301	$20.57
Alfalfa seed	2,858	Pound	533,807	187	.11	58,985	20.64
Barley	188	Bushel	2,456	13	.94	2,311	12.29
Beans	4	...do	12	3	4.92	59	14.75
Cane	794	Ton	1,953	2.5	8.48	16,553	20.87
Corn, Indian	476	Bushel	8,669	18	1.02	8,833	18.55
Corn, sorghum	583	...do	9,660	17	.88	8,454	14.50
Cotton	2,721	Pound	574,834	211	.168	96,614	35.50
Cotton seed	2,721	...do	1,032,962	380	.023	24,208	8.90
Garden	44					2,091	47.52
Grass, Sudan	61	Ton	59	1	8.46	499	8.18
Oats	1,117	Bushel	21,560	19	.67	14,430	12.92
Pasture	2,610					19,818	7.59
Peaches	222	Pound	124,023	559	.032	3,979	17.92
Potatoes, sweet	8	Bushel	700	87.5	1.42	995	124.37
Wheat	889	...do	22,921	26	.78	17,911	20.14
Less duplicated areas	7,616						
Total cropped	14,500	Total and average				416,041	28.70

		Areas.	Acres.	Farms.	Per cent of project.
Irrigated, no crop:		Total irrigable area farms reported	19,000	455	76
Alfalfa, fall seeding	45	Total irrigated area farms reported	16,600	455	66
Oats, fall seeding	391	Under water-right applications	16,600	455	66
Wheat, fall seeding	1,265	Total cropped area farms reported	14,500	455	58
No crop	745				
Less duplicated areas	346				
Total irrigated	16,600				

PUBLIC NOTICES AND ORDERS.

PUBLIC NOTICE, SEPTEMBER 2, 1916.

1. Public notice issued on February 17, 1912, under the reclamation law, for the Carlsbad project, provides among other things for the payment by the water users under the project of a construction charge of $45 per irrigable acre.

2. A majority of the water-right applicants and entrymen whose construction charges were fixed by the public notice of February 17, 1912, and who have accepted the reclamation extension act of August 13, 1914 (38 Stat., 686), having by a vote for that purpose authorized the Pecos Water Users' Association on their behalf to

enter into an agreement with the Secretary of the Interior increasing their construction charge $10 per acre, and such contract having been duly executed under date of March 12, 1915, the lands of all water-right applicants and entrymen whose construction charges were fixed by the public notice of February 17, 1912, and who have accepted the reclamation extension act, became subject to such increased construction charge, and a construction charge of $55 per irrigable acre is hereby announced for all of such land.

3. The increased construction charge of $10 per irrigable acre shall become due and payable in additional annual installments, after the construction charge of $45 per irrigable acre shall have been paid, and the number of installments, amounts payable in each installment, and due dates of installments of the increased construction charge of $10 per irrigable acre shall be as fixed in the first proviso to section 4 of the reclamation extension act, subject also to the second proviso to said section 4.

4. Lands as to which the construction charge is not increased under this public notice, and which are not under the Carlsbad public notice of April 10, 1915, including lands remaining subject to the public notices of December 17, 1907, and November 30, 1908, shall be required to pay an additional charge of $10 per irrigable acre in 20 equal annual installments added to and made a part of the operation and maintenance charge, the first of such installments coming due March 1,1917, and subsequent installments, until further notice, on March 1 of each succeeding year until the additional operation and maintenance charge of $10 per irrigable acre shall have been paid.

BO SWEENEY,
Assistant Secretary of the Interior.

PUBLIC NOTICE, MARCH 9, 1917.

1. *Annual operation and maintenance charges.*—In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and of acts amendatory thereof and supplementary thereto, and particularly of the reclamation extension act of August 13, 1914 (38 Stat., 686), announcement is hereby made that the annual operation and maintenance charge for the irrigation season of 1917 and thereafter until further notice against all lands of the Carlsbad project, New Mexico, under public notice, shall be a minimum charge of 90 cents per irrigable acre whether water is used thereon or not, which charge will permit the delivery of not to exceed 1 acre-foot of water per acre; and that additional water will be furnished up to a limit of 3 acre-feet per irrigable acre for 15 cents per acre-foot, a further amount up to a limit of 4 acre-feet per irrigable acre for 50 cents per acre-foot, and all additional quantities for 75 cents per acre-foot. All operation and maintenance charges will be due and payable on March 1 of each year for the preceding irrigation season.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital given in appendix, p. 505.]

Feature costs of Carlsbad project to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys: Preliminary surveys, etc		$41,081.56
Storage works: McMillan Reservoir	$124,587.03	240,628.00
Dam and spillways: Avalon Reservoir		315,989.46
Administrative general expense	5,484.43	6,116.44
	130,071.46	562,733.90
Canal system:		
Main canal	[1] 1.33	187,828.96
East canal		9,436.95
Black River cut-off canal		17,229.17
Black River canal	1,986.85	25,596.48
Flumes	113.16	20,969.16
Dark Canyon syphon		30,862.33
Wasteways		29,621.29
Administrative general expense		856.97
	2,098.68	322,401.31
Lateral system:		
Laterals and sublaterals	6,452.54	55,659.65
Flume, Avalon		912.49
Syphon, Avalon		5,373.37
Administrative general expense	384.88	991.97
	6,837.42	62,937.48
Drainage system:		
Preliminary and general work	1,464.82	3,959.51
Open drains	28,916.23	49,181.49
Closed drains	1,268.34	34,929.06
Administrative general expense	1,498.87	2,949.86
	33,148.26	91,019.92
Permanent improvements: Real estate (P. I. & I. Co. plant)		155,249.50
Plant accounts: Equipment	318.04	16,222.55
Operation and maintenance charges transferred to and compounded with construction charges		1,934.00
Gross construction cost to June 30, 1917	172,473.86	1,253,580.22
Less revenues earned during construction period:		
Rentals of buildings	140.20	718.20
Rentals of irrigation water		8,163.35
Contractors freight refunds	218.33	218.33
Other revenues, unclassified	227.06	2,584.94
Profit on hospital operations	57.59	[1] 92.92
Total, revenues	643.18	11,591.90
Net cost of construction of project to June 30, 1917		1,241,988.32

[1] Deduct.

Statement of cost by calendar years, Carlsbad project.

Year ending December 31—	Construction.	Operation and maintenance under public notice.	Total cost.
1905	[1] $24,713.44		$24,713.44
1906	[1] 326,675.09		326,675.09
1907	192,504.28		192,504.28
1908	48,225.11	$16,631.26	64,856.37
1909	16,397.25	19,084.71	35,481.96
1910	[2] 3,067.28	16,431.73	13,364.45
1911	239.30	17,607.26	17,846.56
1912	216,129.72	20,169.15	236,298.87
1913	39,589.28	23,387.88	62,977.16
1914	72,434.77	18,771.86	91,206.63
1915	89,152.49	26,686.92	115,839.41
1916	102,397.85	25,549.51	127,947.36
January to June 30, 1917	111,966.37	14,610.33	126,576.70
Plant account to June 30, 1917	16,222.55		16,222.55
Total	1,253,580.22	198,930.61	1,452,510.83

[1] Estimated. [2] Deduct.

Statement of cost by fiscal years, Carlsbad project.

Year ending June 30—	Construction.	Operation and maintenance under public notice.	Total cost.
1905[1]	[2] $9,000.00		[2] $9,000.00
1906	[2] 241,000.00		[2] 241,000.00
1907	224,347.53		224,347.53
1908	103,888.41	[3] $11,705.08	92,183.33
1909	15,057.01	32,734.88	47,791.89
1910	11,445.67	19,958.61	31,404.28
1911	948.57	[3] 11,480.63	[3] 10,532.06
1912	201,198.67	46,691.31	247,889.98
1913	29,819.27	26,760.31	56,579.58
1914	57,094.49	23,662.81	80,757.30
1915	89,863.26	23,734.57	113,597.83
1916	81,538.97	22,283.25	103,822.22
1917	172,473.86	26,290.58	198,764.44
Plant account to June 30, 1916	15,904.51		15,904.51
Total	1,253,580.22	198,930.61	1,452,510.83

[1] 1902–1905. [2] Estimated. [3] Deduct.

Estimated cost of contemplated work, Carlsbad project, fiscal year 1918.

Features.	Estimated cost during fiscal year 1918.	
	Subfeature.	Principal feature.
Lateral system:		
Laterals and sublaterals		
Extensions and structures	$5,000.00	
Concrete lining	16,000.00	
		$21,000.00
Drainage system: Open drains		17,000.00
Operation and maintenance under public notice		26,000.00
Total		64,000.00

NEW MEXICO, HONDO PROJECT.

L. E. Foster, project manager, Carlsbad, N. Mex.

LOCATION.

County: Chaves.
Townships: 11 and 12 S., Rs. 22, 23, and 24 E., New Mexico meridian.
Railroad: Atchinson, Topeka & Santa Fe Ry.
Railroad station and estimated population January 1, 1917, Roswell, N. Mex., 7,500.

WATER SUPPLY.

Source of water supply: Hondo River.
Area of drainage basin: 1,037 square miles.
Annual run-off in acre-feet of Hondo River at the diversion dam (1,037 square miles), 1903 to 1914: Maximum, 90,500; minimum, 2,100; mean, 29,000.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service was prepared to supply water, season of 1916: 2,918 acres.
Area under rental contracts, season of 1916: 1,324 acres.
Length of irrigating season: From March to November—245 days.
Average elevation of irrigable area: 3,750 feet above sea level.
Rainfall on irrigable area: 20 years, average, 15 inches; 1916, 13.91 inches.
Range of temperature on irrigable area: 0° to 100° F.
Character of soil of irrigable area: Rich alluvium.
Principal products: Alfalfa and fruits.
Principal markets: Roswell, N. Mex.; Kansas City, Mo.; Chicago, Ill.; and Texas cities.

LANDS OPENED FOR IRRIGATION.

No lands have been opened for irrigation by public notice; 1,324 acres were irrigated under rental contracts to December 31, 1916.

CHRONOLOGICAL SUMMARY.

Reconnoissance and preliminary surveys begun in 1903.
Construction recommended by board of engineers June 6, 1904.
Construction authorized by Secretary September 6, 1904.
Hondo Reservoir site purchased December 3, 1904.
Hondo Reservoir and inlet canal completed August, 1906.
Distributing canals completed April, 1907.
Project completed May, 1907.
Management of project turned over to Rio Hondo Reservoir Water Users' Association April 1, 1917.

IRRIGATION PLAN.

The irrigation plan of the Hondo project provides for the diversion of water from the Hondo River, about 12 miles southwest of Roswell, N. Mex., through a short inlet canal into a natural storage reservoir, the capacity of which is increased by embankments, the return of stored water to the river, and the diversion of water from the river by three dams, 2, 4, and 6 miles, respectively, below the reservoir, into canal systems watering lands in the vicinity of Roswell, N. Mex. The United States claims all waste, seepage, spring, and percolating water arising within the project and proposes to use such water in connection therewith.
All features of this project are completed.

SUMMARY OF GENERAL DATA FOR HONDO PROJECT TO END OF FISCAL YEAR 1917.

Areas:	
Acreage service could have supplied season of 1916	2,918
Acreage actually irrigated, season of 1916	1,324
Acreage cropped under irrigation, season of 1916	1,219
Crops:	
Value of irrigated crops, season of 1916	$32,200.00
Value of irrigated crops, per acre cropped	$26.42
Finances:	
Gross construction cost to end of fiscal year	$381,621.65
Per cent complete at end of fiscal year	100
Appropriation, fiscal year 1917	[1] $4,863.50
Expenditures during fiscal year, chargeable to 1917 appropriation—	
Disbursements	$2,287.16
Unencumbered balance July 1, 1917	2,576.34
Repayments:	
Water-rental charges—	
Accrued to end of fiscal year	9,163.66
Collected to end of fiscal year	8,929.67
Uncollected at end of fiscal year	233.99

CONSTRUCTION DURING FISCAL YEAR.

There was no construction during the fiscal year on the Hondo project.

OPERATION AND MAINTENANCE.

The entire distribution system was used during the year. The water available, which was about 10,495 acre-feet for the season, was delivered by one man, with an occasional assistant. The river flow was larger than during some former years and fair crops were raised on the small acreage cultivated. Maintenance consisted of keeping silt and weeds from the lateral system.

Historical review, Hondo project.

Item.	1911	1912	1913	1914	1915	1916
Acreage for which service was prepared to supply water	1,100	1,200	1,000	1,224	3,330	2,918
Acreage irrigated	1,136	1,261	932	1,224	1,294	1,324
Miles of canal operated	12½	12½	12½	12½	12½	12½
Water diverted (acre-feet)	21,020	13,062	3,868	22,783	38,135	10,495
Water delivered to land (acre-feet)	1,049	1,640	800	1,108	1,238	1,167
Per acre of land irrigated (acre-feet)	0.90	1.30	0.86	0.91	0.96	0.88

OPERATION BY THE WATER USERS INTERESTED.

Water has been furnished on a rental basis to about 1,200 acres of land on the Hondo project since its completion to a small number of water users. The average cost of operation and maintenance

[1] Includes refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

amounted to $4,500. The receipts from the rental of irrigation water at 80 cents per acre-foot averaged about $1,000 per year. To prevent this loss to the reclamation fund, negotiations were entered into with the water users interested to take over the project during the winter of 1916. A form of contract was submitted to the department for approval in January, 1917. This form of contract was disapproved because the water users were at that time disorganized. Steps were taken by the Hondo water users to organize a corporation, so that a suitable contract could be made with the United States permanently then to maintain and operate the project.

The project was formally turned over to the water users on April 1, 1917. A second contract, which was approved by the department, has been submitted to the water users, but has not yet been signed, owing to the fact that organization of the water users has not yet been completed. It is understood that this will be done at an early date and the contract signed.

SETTLEMENT.

There has been no additional settlement on the project for a number of years, due to the uncertainty of the water supply.

Settlement data, Hondo project.

Item.	1912	1913	1914	1915	1916
Total number of farms in project	26	22	25	29	28
Population	85	77	90	102	101
Number of irrigated farms	23	22	25	29	28
Operated by owners or managers	16	12	14	16	13
Operated by tenants	7	[1] 5	6	13	15
Population	70	77	90	102	101
Number of towns	1	1	1	1	1
Population	7,000	7,000	7,000	7,500	7,500
Total population in towns and on farms	7,085	7,077	7,090	7,602	7,601
Number of public schools	3	3	3	3	3
Number of churches	9	9	9	9	9
Number of banks	4	4	4	4	4
Total capital stock	.....	.....	$350,000.00	$350,000.00	$350,000.00
Total amount of deposits	.....	.....	$2,553,425.16	$2,500,000.00	[2] $2,500,000.00

[1] Five farms not occupied. [2] Estimated.

PRINCIPAL CROPS.

The principal crops are alfalfa, sorghum-head corns, apples, and small fruits. Orchards generally are in poor condition and are dying out. Fairly good results were obtained during the season of 1916 with alfalfa and sorghum-head corn. Crops generally are fed to live stock. A first cutting of alfalfa hay was obtained during the early part of 1916, but later crops were small. Yields for the season were only fair on account of erratic water supply. The general results obtained, however, were better than usual considering water conditions.

Crop report, Hondo project, New Mexico, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa	757	Ton	1,432	1.90	$14.03	$20,101	$26.95
Barley	10	Bushel	300	30	.75	225	22.50
Cane	145	Ton	264	1.82	9.67	2,553	17.60
Corn	75	Bushel	1,550	.66	1.00	1,550	20.66
Corn fodder	135	Ton	527	3.90	9.81	5,171	38.30
Grass, Johnson	20	do	20	1	9.00	180	9.00
Grass, Sudan	30	do	65	2.17	10.00	650	21.66
Ensilage	21	do	120	5.71	8.75	1,050	50.00
Oats	35	Bushel	700	20	.60	420	12.00
Melons	2					300	150.00
Total cropped acreage	1,219	Total and average				32,200	26.42

		Areas.	Acres.	Number farms.	Per cent of project.
Irrigated, no crop:					
New alfalfa	41	Total irrigable area farms reported	2,918	28	29
Apples	64	Total irrigated area farms reported	1,324	28	13
		Under rental contracts	1,324	28	13
Total irrigated acreage	1,324	Total cropped area farms reported	1,219	28	12

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in Appendix, p. 508.]

Feature costs, Hondo project, to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys: Hondo Canal (Diamond A)		$4,422.70
Storage works:		
Storage reservoir and embankment		96,246.60
Outlet excavation and embankment		57,772.59
Protection embankment and outlet canal		825.48
		154,844.67
Canal system (diversion system):		
Headworks and earthwork inlet		58,362.38
Rock excavation for diversion		35,536.31
		93,898.69
Lateral system: Laterals and sublaterals		38,979.34
Irrigable lands (farm units): Farm-unit subdivision		19,837.41
Permanent improvements:		
Real estate (reservoir site, etc.)		21,599.46
Buildings		1,738.99
		23,338.45
Telephone system		4,170.42
Operation and maintenance during construction (water-rental basis)	$3,215.38	42,129.97
Gross construction cost to June 30, 1917	3,215.38	381,621.65
Less revenues earned during construction period:		
Rental of buildings	66.00	286.00
Rentals of irrigation water	934.26	9,163.66
Contractors' freight refunds		159.63
Other revenues, unclassified	70.54	125.90
	1,070.80	9,735.19
Net cost of construction of project to June 30, 1917		371,886.46

Statement of cost by calendar years, Hondo project.

Year ending Dec. 31—	Construction.	Operation and maintenance during construction.	Total cost.
1903	$4,890.15		$4,890.15
1904	30,196.06		30,196.06
1905	160,368.14		160,368.14
1906	153,919.88		153,919.88
1907	9,339.40		9,339.40
1908	6,648.51	$6,369.07	13,017.58
1909	4,943.63 [1] [2] 23,693.59	5,149.23	10,092.86 [1] [2] 23,693.59
1910	4,521.08	4,521.08	9,042.16
1911	5,502.03	5,526.93	11,028.96
1912	4,085.69	4,085.69	8,171.38
1913	5,745.12	2,480.47	8,225.52
1914	[1] 26,974.42	3,514.95	[3] 26,974.42 3,514.95
1915		5,031.64	5,031.64
1916		4,483.98	4,483.98
Jan. 1 to June 30, 1917		966.93	966.93
Total	339,491.68	42,129.97	381,621.65

[1] Deduct.
[2] Collection from bonding company.
[3] Transfer cost of operation and maintenance during construction.

Statement of cost by fiscal years, Hondo project.

Year ending June 30—	Construction.	Operation and maintenance during construction.	Total cost.
1904	$4,890.15		$4,890.15
1905	82,934.32		82,934.32
1906	239,502.12		239,502.12
1907	29,612.07		29,612.07
1908	1,227.78	$3,993.42	5,221.20
1909	830.67 [1] [2] 23,693.59	5,022.77	5,853.44 [1] [2] 23,693.59
1910	[1] 214.40	5,280.96	5,066.56
1911	[1] 62.05	3,464.08	3,402.03
1912	76.41	5,748.65	5,825.06
1913	2,564.03	2,986.41	5,550.44
1914	1,379.29	3,206.02	4,585.31
1915	444.88	5,083.51	5,528.39
1916		4,128.77	4,128.77
1917		3,215.38	3,215.38
Total	339,491.68	42,129.97	381,621.65

[1] Deduct. [2] Collection from bonding company.

Estimated cost of contemplated work during fiscal year 1918, Hondo project.—None.
Project turned over to water-users association April 1, 1917.

NEW MEXICO-TEXAS, RIO GRANDE PROJECT.

L. M. LAWSON, project manager, El Paso, Tex.

LOCATION.

Counties: Socorro, Sierra, Dona Ana, N. Mex.; El Paso, Tex.
Townships: 8 to 29 S., Rs. 3 E. to 5 W., New Mexico meridian.
Railroads: Atchison, Topeka & Santa Fe, El Paso & Southwestern, Southern Pacific, and Texas & Pacific.
Railroad stations and estimated population, January 1, 1917: Texas—El Paso, 75,000; Ysleta, 500; La Tuna, 325; Fabens, 500; Canutillo, 275; Clint, 500; Vinton, 25; and Belen, 20. New Mexico—Las Cruces, 4,500; Mesilla Park, 850; Rincon, 400; Dona Ana, 250; Engle, 150; Berino, 50; Fort Selden, 25; Hatch, 150; Hill, 25; Leasburg, 25; Mesquite, 50; and Vado, 50.

WATER SUPPLY.

Source of water supply: Rio Grande.
Area of drainage basin: 37,000 square miles.
Annual run-off in acre-feet of Rio Grande: At San Marcial (30,000 square miles), 1895 to 1916, inclusive, maximum, 2,422,000; minimum, 200,700; mean, 1,161,350. At El Paso, Tex. (38,600 square miles), 1889 to 1914, inclusive, maximum, 2,010,000; minimum, 50,700; mean, 925,400. Data since 1914, at El Paso, do not include run-off, as most of surplus water is stored in Elephant Butte Reservoir.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service is prepared to supply water, season of 1917: 88,000 acres.
Area under rental contracts, season of 1917: 65,893 acres.
Length of irrigating season: From February 15 to November 15—274 days.
Average elevation of irrigable area: 3,700 feet above sea level.
Rainfall on irrigable area: 32-year average, 10.61 inches; 1916, 7.77 inches.
Range of temperature on irrigable area: —5° to 105° F.
Character of soil of irrigable area: Fertile alluvium and sandy loam.
Principal products: Alfalfa, corn, wheat melons, fruit, and vegetables.
Principal markets: Towns in Texas, New Mexico, Louisiana, and eastern cities.

LANDS OPENED FOR IRRIGATION.

No lands have been opened for irrigation by public notice.
All lands in the Mesilla and El Paso Valleys are being irrigated under rental contracts

CHRONOLOGICAL SUMMARY.

Reconnoissance and preliminary surveys begun in March, 1903.
Construction of Leasburg unit authorized December 2, 1905.
Reclamation act extended to Texas June 12, 1906 (34 Stat., 259).
Treaty with Mexico providing for distribution of waters of the Rio Grande proclaimed January 16, 1907.
Construction of Elephant Butte Dam authorized by Congress and $1,000,000 appropriated March 4, 1907 (34 Stat., 1357).
Leasburg unit completed July, 1908.
First irrigation by Reclamation Service (Leasburg unit), season of 1908.
Construction of Elephant Butte Dam authorized by Secretary May 23, 1910.
Construction plans of Elephant Butte Dam approved by board of engineers June 6, 1910, January 22, 1911, August 12, 1912, January 30, 1913.
Construction plans approved by Secretary October 26, 1910.
Franklin Canal purchased October, 1912.

First 11 miles of Franklin Canal reconstructed March, 1914.
Second section (8 miles) reconstructed 1915.
East Side Canal completed September, 1915.
West Side Canal completed November, 1915.
San Elizario Feed Canal completed April, 1916.
Elephant Butte Dam completed May 13, 1916.
Mesilla Diversion Dam completed May 31, 1916.
Leasburg Extension Canal and Picacho Branch Canal to station 121 completed May 31, 1916.
Percha Diversion Dam, construction begun July, 1916; 90 per cent complete June 30, 1917.
Arrey Canal, construction begun July, 1916; 98 per cent complete June 30, 1917.
Juan de Herrera Siphon, constructed May and June, 1917.
Mesilla Valley, East River drain, construction begun April, 1916.
El Paso Valley Mesa drain, construction begun May, 1916.
Project, exclusive of Elephant Butte storage, 30.2 per cent completed June 30, 1917.
Project, including Elephant Butte storage, 59.6 per cent completed June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the Rio Grande project provides for the storage of flood waters of the Rio Grande in a reservoir controlled by Elephant Butte Dam, about 12 miles west of Engle, N. Mex., and the diversion of water from the Rio Grande, about 24 miles below for watering lands in Rincon Valley; about 60 miles below for the irrigation of 28,000 acres in the upper Mesilla Valley under the Leasburg Diversion Dam; about 80 miles below for the irrigation of 57,000 acres in the lower Mesilla Valley under the Mesilla Dam; and about 120 miles below for supplying water to lands in El Paso Valley and furnishing 60,000 acre-feet per annum for use on land in El Paso Valley on the Mexican side of the Rio Grande. The United States claims all waste, seepage, spring, and percolating water arising within the project and proposes to use such water in connection therewith. All irrigation works required for Las Palomas and Rincon Valleys will be new; those for the Mesilla Valley include a diversion dam and 10.8 miles of canal now constructed, as well as a diversion dam 5½ miles southwest of Las Cruces and 27 miles of canal leading therefrom, which have also been constructed; and those required for El Paso Valley will supplement and improve present canal systems.

The features of the above irrigation plan that have been completed are the diversion dam, headworks, and main canal for the 28,000 acres in the upper Mesilla Valley unit; the construction of the Mesilla Diversion Dam and East Side and West Side Canals in the lower Mesilla Valley; the reconstruction of a portion of the Franklin Canal; and the construction of the San Elizario Feed Canal in the El Paso Valley.

Percha Dam at the upper end of the Rincon Valley is 90 per cent completed; the Arrey Canal, the first unit of the Rincon Canal System, is 98 per cent completed, and construction has been begun on the second unit. The construction of two main drains is also under way.

SUMMARY OF GENERAL DATA FOR RIO GRANDE PROJECT TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is complete		155,000
Public land entered to end of fiscal year	553	
Public land withdrawn at end of fiscal year	4,890	
State land	2,602	
Private land	146,955	
Acreage service could have supplied season of 1916		85,000
Addition in fiscal year, 1917		3,000
Estimated addition in fiscal year, 1918		7,000
Estimated acreage service can supply July 1, 1918		95,000
Acreage actually irrigated, season of 1916		62,513
Acreage cropped under irrigation, season of 1916		61,818
Crops:		
Value of irrigated crops, season of 1916		$2,893,740.00
Value of irrigated crops, per acre cropped		46.81

Finances:			
Gross construction cost to end of fiscal year			$7,206,914.75
Per cent complete at end of fiscal year			59.6
Appropriated for fiscal year 1918, total			[1] $648,000.00
Allotment for construction, fiscal year 1918			$480,500.00
Estimated per cent complete, June 30, 1918			65.1
Proposed appropriation, fiscal year 1919, for construction			$1,105,000.00
Estimated gross construction expenditures to June 30, 1919			$8,792,414.75
Estimated per cent complete, June 30, 1919			74
Appropriation, fiscal year 1917			[2] $1,276,406.05
Expenditures during fiscal year, chargeable to 1917 appropriation—			
Disbursements	$440,268.79		
Transfers	32,075.96		
		$472,344.75	
Registered liabilities chargeable to 1917 appropriation		90,769.87	
Contract obligations wholly covered by 1917 appropriation		184,612.10	
			747,726.72
Unencumbered balance, July 1, 1917			528,679.33
Repayments:			
Water rental charges—			
Accrued to end of fiscal year			$280,394.40
Collected to end of fiscal year			263,149.82
Uncollected at end of fiscal year			17,244.58
Drainage:			
Estimated acreage damaged by seepage to end of fiscal year			55,000
Miles of open drains built to end of fiscal year			11.5
Estimated acreage protected by drains built to end of fiscal year			5,100
Estimated acreage to be protected by authorized system			[3]
Cost of drainage works to end of fiscal year			$115,705.81

CONSTRUCTION DURING FISCAL YEAR.

Percha Dam.—During July, 1916, construction of Percha Dam at the head of the Rincon Valley was begun. This dam is of the ogee type, 11 feet high above the apron, and 17 feet above the bottom of the concrete cut-off, with 12 feet of steel sheet piling below this. The weir is 350 feet long, with two 8 by 20-foot Taintor sluice gates at the west end, eight intake gates in the west heading, and one in the east. Twenty-three thousand three hundred and sixty-seven cubic yards of excavation and 4,346 cubic yards of concrete were involved.

Arrey Canal.—Preparations for construction of structures on the Arrey Canal by Government forces were begun in July, and at the end of the fiscal year the structures were 97 per cent completed. Bids for excavation were opened on November 24, 1916, and the work was awarded to the Lee Moor Contracting Co. Excavation was completed April 20, 1917.

Garfield Canal.—Construction of structures by Government forces on the Garfield Canal, the second unit of the Rincon Valley Main

[1] Plus unexpended balance of 1917 appropriation.

[2] Includes balance of 1916 appropriation and refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

[3] Preliminary plans have been developed for the construction of drains to protect 100,000 acres of land in Texas and New Mexico, but work at present is suspended pending drawing up of a suitable contract with the newly formed irrigation district in Texas, while the district has not yet been formed in New Mexico.

Canal, was begun in May, 1917. On May 23 bids were opened for the excavation of this unit, with the exception of 1 mile at the lower end, and award was made to Knowles & Warren, of El Paso, Tex., but at the end of the fiscal year the contract had not been executed.

Garfield Flume.—At the end of the fiscal year the false work had been erected and a few of the permanent piles driven. All material for the structure had been purchased and much of it was on the ground on June 30.

Franklin Canal.—A new desagua was constructed at the end of the Franklin Canal, with a concrete check and drop, and the old desagua used as an outlet for the El Paso Valley Mesa drain. A concrete check and turnouts were also built at Station 1293.

San Elizario Canal.—The San Elizario community ditch was taken over by the Government in January, 1917, a portion of it enlarged and cleaned, and four temporary wooden structures built. This will become a part of the main canal system.

Lateral system.—The Juan de Herrera, Thompson, Pena, San Jose, and upper portions of the Clint and Salitral community ditches were deeded to the Government during the early part of 1917. As a beginning on the lateral system a concrete siphon from the Franklin Canal, leading under the Galveston, Harrisburg & San Antonio Railroad, was built during the last part of the fiscal year.

Drainage construction.—At the end of the fiscal year 7.8 miles of the Mesilla Valley East River drain had been constructed, from which 260,532 cubic yards of material had been removed, and 3.7 miles of the El Paso Valley Mesa drain, involving the excavation of 161,732 cubic yards. Four new Bucyrus caterpillar drag-line machines were being delivered at the end of the fiscal year. In accordance with the provisions of the last reclamation appropriation bill, the cost of these machines, as well as the cost of their operation, is to be borne by the two water users' associations until irrigation districts are formed and suitable contracts made with the Reclamation Service.

Surveys.—Surveys were completed for Percha Dam and the Arrey and Garfield units of the Rincon Canal system, and preliminary surveys made of the Hatch and Rincon units. Extensive drainage surveys have been made, additional test wells set in the Mesilla Valley, and wells placed over a portion of the Rincon district. In May surveys were begun on the lateral system in the El Paso Valley, preparatory to beginning construction. The silt survey of the Elephant Butte Reservoir was completed in February, and this party then started work on a profile of the river from Elephant Butte to Fabens, Tex.; a traverse of the river is also being run in the El Paso Valley.

SEEPAGE AND DRAINAGE.

Investigations.—Investigations of the ground-water conditions by means of test wells, which were begun in 1913, have been continued and extended until now practically the whole project is covered. Well readings are taken at regular intervals of two months. Records from these wells show seasonal rise each year, and a constant rise from year to year which averages a foot per year. For the engineering board meeting held in February to consider the drainage problem, studies were made which showed that over 35 to 40 per cent of the irrigable area had water less than 4 feet from the surface in December, 1916, at a time when the ground water is at its lowest.

Construction.—Two drag-line excavators worked throughout the year on two drains, one in the El Paso Valley and another in the Mesilla Valley. At the end of the year, 11.5 miles of open drains had been constructed. A great deal of delay was experienced during the winter, when the irrigation ditches were dry, and an attempt was made to pump boiler water from wells. The ground water was so alkaline that it foamed in the boilers. Four large Bucyrus drag-line excavators of the caterpillar type, with internal combustion oil engines, were being delivered at the end of the fiscal year, and it is expected four more will be ordered for delivery early in 1918. With these machines on hand it is expected the construction of the drainage system will be pushed with all possible expedition.

Irrigation districts.—All the construction work is going forward with the understanding on the part of the Reclamation Service that irrigation districts will be formed and contracts entered into between them and the Department of the Interior. On that portion of the project lying in Texas, a water improvement district has been organized. The contract awaits the approval of the Secretary of the Interior and then must be voted on by the district; meantime construction work will be financed by the district, to be reimbursed upon approval of the contract. In Texas, the district organization will not entirely take the place of the El Paso Valley Water Users' Association, as the Texas law permits the district to vote expenditures not to exceed 25 per cent of the assessed valuation, and as the total construction charges of the Rio Grande project will exceed this per cent both organizations must be kept up. In New Mexico only the preliminary steps have been taken for the formation of an irrigation district; but, as in the El Paso Valley, arrangements are being made for the Elephant Butte Water Users' Association to finance the construction until the district is organized and a contract entered into, when reimbursement will be made. When this district is organized it will succeed the Elephant Butte Water Users' Association.

BOARD MEETINGS.

February 10, 1917; purpose, drainage; personnel, D. C. Henny, E. H. Baldwin, D. W. Murphy.

OPERATION AND MAINTENANCE.

The Reclamation Service delivered water in 1916 on a rental basis for the irrigation of 62,513 acres of land. Of this amount 47,092 acres were in New Mexico, and water was supplied under contract with the Elephant Butte Water Users' Association at the rate of actual cost of operation and maintenance plus 10 per cent; in addition a charge of 50 cents per acre was made for reservoir service. In the El Paso Valley, in Texas, water was supplied to 15,421 acres under contracts with various community ditches and individuals. The rates charged for water in the El Paso Valley were 40 cents per acre-foot for the first 3 acre-feet per acre and 50 cents per acre-foot for any water used in excess of 3 acre-feet per acre. In addition, a charge of 50 cents per acre was made for reservoir service.

In the New Mexico portion of the project 361,184 acre-feet were delivered for irrigation purposes, giving a duty of 7.66 acre-feet per

acre. In the Texas portion the total amount delivered was 59,462 acre-feet, giving a duty of 3.86 acre-feet per acre.

For the season of 1917 the contract for water delivery in New Mexico provides for the same rates as in 1916. In the El Paso Valley all water deliveries are under individual contracts at the same rates as applied in 1916. On June 30, 1917, a total of 65,893 acres were being supplied from canals operated by the Reclamation Service. Of this amount 48,102 acres were in New Mexico and 17,791 acres in Texas. A total of 267,742 acre-feet of water had been delivered in 1917 to June 30.

Historical review, Rio Grande project.

Item.	1912	1913	1914	1915	1916	1917 [1]
Acreage for which the service was prepared to supply water	25,000	35,000	40,000	45,000	85,000	88,000
Acreage irrigated	23,115	27,723	28,442	33,876	62,513	66,000
Miles of canal operated	6	37	37	37	75½	75½
Water diverted [2] (acre-feet)	125,000	149,610	179,964	199,952	420,646	460,000
Water delivered to land per acre irrigated [2] (acre-feet)	5.40	4.34	5.68	5.90	6.73	6.96

[1] Estimated.
[2] Measured at point of delivery from canals. Does not include silting and scouring water delivered free of charge.

SETTLEMENT.

During 1916 an immigration bureau was maintained by the Elephant Butte Water Users' Association for the purpose of cooperative selling of private land in the Mesilla Valley and the advertising of project lands. The results obtained were not deemed satisfactory, and at the end of the year the work was discontinued and the bureau abolished.

Owing to a lack of proper drainage works and overirrigation of the cultivated land the project was seriously affected by the rise of ground water, causing a reduction of crop production and many unsightly seeped areas. In addition the lateral systems in use were inefficient and rendered the water service somewhat precarious. Considering these conditions, the more thoughtful of the water users on the project decided not to encourage settlement until conditions could be bettered, and as a result the settlement on the project was light.

After starting work on the drainage canals and publication of the results of successful experiments in growing sugar beets, coupled with the announcement that the Holly Sugar Co. would build a factory at Las Cruces, a new interest developed in the subdivision and settlement of the project lands. During the latter part of 1916 and the early part of 1917 a number of colonization agents looked over the valleys of the project and were endeavoring to interest prospective settlers.

With a completed drainage system and an efficient lateral system, so that irrigation water can be delivered to each individual water user, it is believed that there will be no difficulty in finding settlers for all of the available land, as the soil yields bountifully and ready markets for produce are found on the project.

Settlement data, Rio Grande project.

Item.	1913	1914	1915	1916	1917
Total number of farms on project	1,784	1,536	1,700	1,638	1,800
Population	6,947	6,642	10,000	10,431	11,000
Number irrigated farms	1,784	1,536	1,700	1,638	1,800
Operated by owners	1,089	932	1,000	1,145	1,200
Operated by tenants	695	604	700	493	600
Population	6,947	6,642	10,000	10,431	11,000
Number of towns	27	25	25	25	25
Population	74,918	78,135	80,000	86,331	87,000
Total population in towns and farms	81,865	84,777	90,000	96,762	98,000
Number public schools	47	47	52	52	52
Number churches	76	81	85	87	90
Number of banks	14	14	19	19	19
Total amount of capital stock	$2,580,000	$2,645,000	$3,251,000	$3,251,000	$3,251,000
Total amount of deposits	$10,398,000	$11,653,000	$19,916,380	$29,282,455	$31,000,000
Total number of depositors	40,000	45,784	48,090	50,000	50,000

PRINCIPAL CROPS.

Alfalfa is the principal crop on the project and on well-drained land yields abundantly. The production in 1916 was low, on account of seepage conditions, but prices received were excellent and ranged from $15 to $30 per ton. The price was still high in 1916, and the first crop was sold at an average price of $22 per ton. Grain made excellent returns in 1916, but the production per acre will be lower in 1917, on account of climatic conditions and high winds. Pears produced well in 1916, and prices received were good; the 1917 crop, however, is nearly a failure. Garden truck, sweet potatoes, and vegetables did well in 1916, and promise abundant yields in 1917.

Crop report, Rio Grande project, New Mexico-Texas, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa	37,762	Ton	94,405	3.5	$16.00	$1,510,480	$40.00
Alfalfa seed	607	Bushel	3,873	6.4	7.20	27,886	45.94
Apples	309	Pound	3,090,000	10,000	.02	61,800	200.00
Barley	1,271	Bushel	49,808	39	1.20	59,770	47.03
Beans	1,292	do	16,418	12.7	4.20	68,956	53.37
Beets, sugar	103	Ton	721	7	5.00	3,605	35.00
Cantaloupes	168	Crate	50,400	300	1.20	60,480	360.00
Corn, Indian	8,253	Bushel	181,566	22	1.20	217,879	26.40
Corn, sorghum	703	do	14,060	20	1.20	16,872	24.00
Corn, fodder	1,254	Ton	10,032	8	3.00	30,096	24.00
Fruits, small	103	Pound	206,000	2,000	.03	6,180	60.00
Garden	2,010					150,750	75.00
Hay	141	Ton	423	3	15.00	6,345	45.00
Millett seed	25	Bushel	1,750	70	.60	1,050	42.00
Oats	1,623	do	73,035	45	.75	54,776	33.75
Onions	8	do	1,360	170	2.25	3,060	382.50
Pasture	1,211					20,587	17.00
Peaches	194	Pound	2,242,000	11,557	.03	67,260	346.70
Pears	615	do	6,150,000	10,000	.03	184,500	300.00
Peas	18	Bushel	54	3	6.00	324	18.00
Potatoes, sweet	226	do	19,210	85	.75	14,407	63.75
Rye	1	do	40	40	3.00	120	120.00
Wheat	5,988	do	215,705	36	1.50	323,557	54.03
Watermelons	15	Ton	150	10	20.00	3,000	200.00
Less duplicated areas	2,082						
Total cropped acreage	61,818		Total and average			2,893,740	46.81

		Areas.	Acres.	Farms.
Irrigated, no crop	695	Total irrigated area farms reported	62,513	1,638
Total irrigated	62,513	Under rental contracts	62,513	1,638
		Total cropped area farms reported	61,818	1,638

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix, p. 508.]

Feature cost of Rio Grande project to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys:		
Project, general	$243.51	$76,619.16
High Line Canal	84.91	37,513.76
Silt deposits, Elephant Butte Reservoir	5,763.79	8,019.44
Hydrographic survey, New Mexico	9.42	5,534.43
Hydrographic survey, Colorado	59.22	15,409.70
Drainage investigations, San Luis Valley	24.34	7,286.53
San Marcial investigations	11.09	1,792.34
	6,196.28	152,175.36
Storage system:		
Preliminary and general	1,329.78	398,350.48
Elephant Butte Dam	9,475.37	4,260,545.48
Embankment	.....	129,946.04
Spillway	3.48	124,461.35
	10,808.63	4,913,303.35
Canal system:		
Palomas system, preliminary	149.95	1,657.48
Rincon system, preliminary	10,040.98	21,356.72
Percha Dam	112,608.08	116,203.08
Arrey Canal	96,391.52	97,791.32
Garfield Canal	21,885.37	22,201.27
Leasburg system:		
Preliminary	96.28	29,438.57
Leasburg Diversion Dam	.....	92,669.54
Leasburg Canal	.....	86,495.39
Leasburg Extension Canal	620.61	40,830.63
Picacho Branch Canal	7,372.20	16,067.55
Mesilla system:		
Mesilla Diversion Dam	.....	126,114.65
Mesilla West Side Canal	.....	263,294.46
Mesilla East Side Canal	6.00	121,988.39
El Paso system:		
Preliminary	479.08	145,228.09
Franklin Canal	8,885.78	314,043.02
San Elizario Feeder Canal	85.78	23,965.61
San Elizario Canal	7,703.39	8,145.89
Minor structures	32.20	32.20
San Elizario headgate	1,463.06	1,463.06
Guadalupe headgate	1,587.39	1,587.39
	269,407.67	1,530,574.31
Lateral system:		
Leasburg system and preliminary	22.56	3,959.77
Mesilla West Side, preliminary	59.35	4,055.66
Mesilla East Side, preliminary	50.57	4,568.03
El Paso system—		
Preliminary	1,325.32	5,736.82
Bovee lateral	5.88	1,463.86
Surveys, Lateral District No. 2	1,269.80	1,269.80
Juan de Herrera Siphon	7,628.93	7,630.49
	10,362.41	28,684.43
Drainage system:		
Project as a whole, preliminary	6.00	164.51
Palomas system, preliminary	.75	20.41
Rincon system, preliminary	587.14	587.14
Mesilla system—		
Preliminary	3,357.03	15,426.45
East River drain	41,600.83	47,500.24
El Paso system—		
Preliminary	3,614.61	14,784.49
Mesa drain	30,875.94	36,071.49
Montoya system	1,121.98	1,151.08
	81,164.28	115,705.81

[1] Deduct.

Feature cost of Rio Grande project to June 30, 1917—Continued.

Feature.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Flood protection:		
Project as a whole, preliminary	$2,124.72	$2,408.29
Palomas system		33.43
Leasburg system: Cut-off in river channel		13,877.59
Mesilla system—		
Mesilla levee at East Side Canal headworks		2,620.03
Mesilla levee at West Side Canal headworks		2,841.17
El Paso System, preliminary	12.24	23.12
	3,539.53	21,803.63
Power system: Transmission lines	27.31	1,294.14
Farm units:		
Project as a whole		1,946.80
Palomas system		3,352.33
Rincon system		20,855.02
Leasburg system		14,530.50
Mesilla system		52,405.21
El Paso system		27,962.01
		121,051.87
Permanent improvements:		
Leasburg system—		
Buildings		3,053.02
Roads		10,375.60 319.73
Mesla system—		
Buildings		1,358.90
Roads		1,511.42
El Paso system—Buildings		1,381.26
Elephant Butte—Roads	74.56	26,612.37
Rincon Valley	1,428.87	1,428.87
	1,503.43	46,041.17
Telephone system:		
Leasburg system	.22	1,400.52
Mesilla system		8,761.24
El Paso system	[1] 167.83	
	[1] 167.61	10,161.76
Operation and maintenance during construction (water-rental basis)	68,586.76	219,720.29
Plant accounts:		
El Paso	49,176.52	87,880.60
Elephant Butte	[1] 88,827.68	[1] 88,827.68
Adjustments	7,451.55	7,451.55
	[1] 32,199.61	6,504.47
Loss on buildings and cottages	39,894.16	39,894.16
Gross construction cost of project to June 30, 1917	459,123.24	7,206,914.75
Less revenues earned during construction period:		
Rental of buildings	[1] 21,552.85	11,608.06
Rentals of power and light		2,243.33
Rentals of irrigation water	67,941.15	280,394.40
Contractor's freight refunds	831.62	5,202.05
Forfeitures by defaulting bidders and contractors	36.58	5,350.01
Other revenues, unclassified	35.85	620.19
Profit on mess-house operations	[1] 3,219.94	[1] 6,516.12
Profit on mercantile store operations	[1] 576.53	86,502.69
Profit on hospital operations	1,872.64	1,421.16
	45,368.52	386,825.77
Net cost of construction of project to June 30, 1917		6,820,088.98

[1] Deduct.

Statement of cost by calendar years, Rio Grande project.

Year ending December 31—	Construction.	Operation and maintenance during construction.	Total.
1906	$24,589.24		$24,589.24
1907	141,484.18	$2,398.86	143,883.04
1908	153,567.87	2,400.51	155,968.38
1909	105,421.86	1,890.88	107,312.74
1910	334,599.30	4,435.18	339,034.48
1911	585,991.02	5,303.18	591,294.20
1912	859,515.72	5,587.05	865,102.77
1913	942,232.25	23,864.19	966,096.44
1914	2,099,399.24	30,736.25	2,130,135.49
1915	901,476.03	47,770.61	949,246.64
1916	520,271.53	58,346.46	578,617.99
January to June 30, 1917	318,646.22	36,987.12	355,633.34
Total	6,987,194.46	219,720.29	7,206,914.75

Statement of cost by fiscal years, Rio Grande project.

Year ending June 30—	Construction.	Operation and maintenance during construction.	Total.
1907	$89,757.29		$89,757.29
1908	174,949.01	$2,138.18	177,087.19
1909	113,335.41	1,167.54	114,502.95
1910	259,654.15	6,856.40	266,510.55
1911	303,292.41	5,680.44	308,972.85
1912	777,317.32	5,678.88	782,996.20
1913	947,304.36	7,447.45	954,751.81
1914	1,451,013.42	33,490.27	1,484,503.69
1915	1,500,688.47	47,277.71	1,547,966.18
1916	979,346.14	41,396.66	1,020,742.80
1917	390,536.48	68,586.76	459,123.24
Total	6,987,194.46	219,720.29	7,206,914.75

Estimated cost of contemplated work, Rio Grande project, during fiscal year 1918.

Features.	Estimated cost during fiscal year 1918.	
	Subfeature.	Principal feature.
Examination and surveys:		
Office work to complete Elephant Butte silt survey	$500	
Miscellaneous hydrometric work not directly chargeable to operation and maintenance	500	
Surveys and office studies in connection with study of the drainage problem	1,500	
		$2,500
Canal system:		
Surveys and designs, Rincon Canal system	5,000	
Completion of Percha Dam	10,050	
Completion of Arrey Canal	1,000	
Construction of Garfield flume	37,000	
Excavation of Garfield Canal[1]	[1] 34,816	
Structures, Garfield Canal	39,330	
Hatch siphon across Rio Grande	50,000	
Hatch Canal right of way	3,000	
Hatch Canal excavation	42,000	
Hatch Canal structures	20,000	
Rincon siphon across Rio Grande	34,500	
Partial construction, Rincon Canal	12,370	
Erection of Picacho flume	12,000	
Construction of Picacho Canal in Picacho district	8,750	
Raising banks of West Side Canal	8,000	
Surveys, designs, and preliminary work, San Elizario Canal	5,000	
		288,000
Lateral system:		
El Paso Valley system—		
Surveys and designs	8,000	
Right of way, Juan de Herrera lateral	10,000	
Excavation, Juan de Herrera lateral	51,000	
Lining and structures	31,000	
		100,000
Drainage system:[2]		
Flood protection: Surveys and office studies		5,000
Farm units: Correction and revision to date of farm property maps		5,000
Operation and maintenance, under water rental:		
Operation and maintenance of Elephant Butte Dam	7,822	
Operation, Leasburg system	3,563	
Maintenance, Leasburg system	6,397	
Operation, Mesilla system	9,628	
Maintenance, Mesilla system	23,354	
Operation, El Paso system	12,393	
Maintenance, El Paso system	12,338	
Operation, Rincon system	1,185	
Maintenance, Rincon system	1,920	
Maintenance, telephone system	400	
General hydrography	1,000	
		80,000
Stores and other operations		4,000
Plant and equipment:		
Erection of four drag-line machines	4,000	
Two motor trucks	4,800	
Three Ford automobiles	1,500	
Two fuel oil tanks	2,000	
Engines and pumping equipment	2,000	
Metal-sheet piling	2,000	
Miscellaneous small equipment	2,000	
Erection of two storehouses	1,700	
		20,000
Total		504,500

[1] This work was advertised and work awarded during the fiscal year 1917, and funds for that year were encumbered for the amount of the contract.

[2] $200,000 is held in reserve for the construction of open drains in the Mesilla and El Paso Valleys, providing irrigation districts are formed and suitable contracts are made with the Reclamation Service.

NORTH DAKOTA, NORTH DAKOTA PUMPING PROJECT.

W. S. Arthur, project manager, Williston, N. Dak.

LOCATION.

County: Williams.

Townships: 152 to 155 N., Rs. 100 to 104 W., fifth principal meridian.

Railroad: Great Northern.

Railroad stations and estimated population January 1, 1917: Buford, 75; Trenton, 150, and Marley (less than 25), on Buford-Trenton unit are small unincorporated villages. Williston, on the Williston unit, is an incorporated city of about 5,300 population.

WATER SUPPLY.

Source of water supply: Missouri River.

Area of drainage basin: 155,000 square miles.

Mean run-off of Missouri River, near Williston, May to October, 1905 to 1907: 15,000,000 acre-feet.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service is prepared to supply water, season 1917: Buford-Trenton unit, 4,049 acres; Williston unit, 8,189 acres.

Area under water-right applications and water rental contracts to June 30, 1917: 5,706.48 acres.

No part of the project was irrigated in 1915. The Williston unit is being operated for commercial power, under a contract with the city of Williston.

Length of the irrigation season: 80 days, beginning from June 1 to June 15.

Average elevation of the irrigable area: 1,900 feet above sea level.

Rainfall: The actual precipitation, calendar year 1916, was 16.84 inches. The average for 13 years, beginning in 1904, is 13.76 inches.

Range of temperature on the irrigable area: −49° to 107° F.

Character of soil on irrigable area: Ranges from sandy loam to heavy clay gumbo.

Principal products: Alfalfa, grains, vegetables. The production of corn for silage is increasing as well as the output of hogs, and dairying has become well established.

Principal markets: St. Paul, Minneapolis, Duluth, Chicago. The local market is now important since it consumes all of the butter product and all of the output from the dairies.

LANDS OPENED FOR IRRIGATION.

Dates of public notices and orders: Buford-Trenton unit, April 8, 1908; March 9, 1911; May 13, 1911; June 25, 1912; July 15, 1913; February 26, 1914; March 7, 1914. Williston unit, April 27 and November 30, 1908; April 30, 1909; March 9 and April 14, 1911; June 25, 1912; March 11, 1913; June 23, 1913; July 15, 1913; July 21, 1913; February 26, 1914; March 7, 1914.

Location of lands opened: Buford-Trenton unit, Tps. 152 and 153 N., Rs. 103 and 104 W., fifth principal meridian; Williston unit, Tps. 154 and 155, N., Rs. 100 and 101 W., fifth principal meridian.

Present status of irrigable lands: Buford-Trenton unit, 249 acres entered subject to reclamation act; 212 acres open to entry; 91 acres of State lands; 3,420 acres in private ownership. Williston unit, 54 acres entered subject to the reclamation act; 320 acres open to entry; 67 acres of State lands; 7,707 acres in private ownership.

Limit of area of farm units: Public, 80 acres; private, 160 acres.

Duty of water: Two acre-feet per acre per annum at the farm.

Building charge per acre of irrigable land: $38 under public notice of 1908.

Annual operation and maintenance charge: 70 cents per acre of irrigable land and 50 cents per acre-foot of water actually used, under public notices of 1908; $1.50 per acre of irrigable land and $1 per acre-foot of water used under order of May 13, 1911. For season of 1914 the project was on a rental basis and the terms were $1 per acre, including 1 acre-foot of water, and $1 per acre-foot for water delivered in excess of 1 acre-foot per acre.

CHRONOLOGICAL SUMMARY.

Reconnoissance and preliminary surveys begun in 1903.
Construction recommended by board of engineers September 22, 1905.
Construction authorized by Secretary January 23, 1906.
First division: Buford-Trenton unit, completed November, 1907.
Power and pumping plants: Williston unit, completed for present use in the fall of 1907; first division completed in the spring of 1908.
Pumping plant and transmission lines: Buford-Trenton unit, completed for present use in the spring of 1908.
First irrigation by Reclamation Service, season of 1908.
Power installation completed for 2,000 horsepower June 30, 1910.
Buford-Trenton unit, 38 per cent completed June 30, 1917; Williston unit, 64 per cent completed June 30, 1917.
Entire project, 64 per cent completed June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the North Dakota pumping project provides for a central steam-power plant located near Williston, operating pumps and generating electricity for the operation of other pumps on the Buford-Trenton and Williston units. On the Buford-Trenton unit water is pumped from a barge into a settling basin 30 feet above the river, and is then lifted by a permanent pumping station into a canal, 50 feet above the settling basin, for the irrigation of bench lands near Buford. A transmission line 28.3 miles in length delivers power for the operation of the pumps. The plan of the Williston unit provides for a series of motor-driven centrifugal pumps on a barge in the Missouri River, a settling basin receiving the water from the barge, and a main canal of 90 second-feet capacity extending along Little Muddy Creek to the power plant, where two sets of steam-driven turbines operate centrifugal pumps to lift water 51 feet into E Canal. From the main canal, about midway between the river and the power plant electrically driven pumps raise 35 second-feet 28 feet into B Canal, and from the B Canal 20 second-feet are raised an additional 28 feet into C Canal. The main power station is located close to a 9-foot vein of lignite coal, from which fuel is obtained.

The United States claims all waste, seepage, spring, and percolating water arising within the project, and proposes to use such water in connection therewith.

The features of the above irrigation plan which have been completed are: The central power station, coal mine and transmission lines; at Buford-Trenton unit, two pumping stations, settling basin, and canal system; at Williston unit, four pumping stations, two settling basins, and canal system. No construction work is in progress at present.

Features remaining for future construction are: The enlargement of the power house and installation of additional machinery; at Buford-Trenton unit, extension of Highline Canal and construction of Lowline Canal and laterals for irrigation of bottom lands; at Williston unit, construction of east and west bottom canal systems, with additional intake and pumping stations.

SUMMARY OF GENERAL DATA FOR NORTH DAKOTA PUMPING PROJECT TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is complete		26,273
Public land entered to end of fiscal year	303	
Public land open to entry at end of fiscal year	532	
Public land withdrawn at end of fiscal year	78	
State land	1,073	
Private land	24,287	
Acreage service could have supplied season of 1916		12,238
Estimated acreage service can supply July 1, 1918		12,238
Finances:		
Gross construction cost to end of fiscal year		$739,880.25
Per cent complete at end of fiscal year		64
Appropriated for fiscal year 1918, total		$54,000.00
Estimated per cent complete, June 30, 1918		64
Estimated gross construction expenditures to June 30, 1919		$739,880.25
Estimated per cent complete, June 30, 1919		64
Announced construction charges per acre		$38.00

Finances—Continued.		
Appropriation, fiscal year 1917		[1]$80,544.50
Expenditures during fiscal year, chargeable to 1917 appropriation—		
Disbursements	$22,616.19	
Transfers	1,574.25	
	$24,190.44	
Registered liabilities chargeable to 1917 appropriation	2,397.41	
		26,587.85
Unencumbered balance, July 1, 1917		53,956.65
Repayments:		
Construction charges—		
Accrued to end of fiscal year		$48,066.21
Collected to end of fiscal year		8,669.64
Uncollected at end of fiscal year		39,396.57
Operation and maintenance charges (public notice)—		
Accrued to end of fiscal year		$24,340.51
Collected to end of fiscal year		13,025.88
Uncollected at end of fiscal year		11,314.63
Water-rental charges—		
Accrued to end of fiscal year		$2,948.58
Collected to end of fiscal year		2,149.03
Uncollected at end of fiscal year		799.55
Power earnings—		
Accrued to end of fiscal year		$105,881.95
Collected to end of fiscal year		103,423.95
Uncollected at end of fiscal year		2,458.00
Drainage:		
Miles of drains built to end of fiscal year: Open		12.7
Cost of drainage works to end of fiscal year		$3,546.95

ECONOMIES OF GOVERNMENT WORK.

Coal mine.—During the fiscal year 1917 coal mining costs were again below the original estimate at the inception of the project. In the fifth annual report it was assumed that "the total cost per ton delivered at the plant will be about $1.25, allowing for maintenance of the mining plant and tramway," and this is practically the average cost of the principal mines in this section. Plants purchasing their fuel supply pay $2.25 to $2.75 for coal delivered.

During the year 8,371 tons of coal were mined at a cost of $9,734 or $1.16 per ton, and a table of monthly costs shows a reduction of the unit cost for every month but one since December 31, 1912. The average cost for the life of the mine has been reduced in that period from $1.89 to $1.53, while the average costs of the last three years, namely, $1.08, $1.115 and $1.16, show that the coal mining operations are on an efficient basis. These reduced costs have been affected with an output of approximately 25 tons per day. If irrigation operations should be resumed or demand for coal otherwise

[1] Includes refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

increased, a further reduction in unit costs would be made and an even better comparison made with the largest operations in the country.

COMMERCIAL POWER.

A contract with the city of Williston, dated October 16, 1912, covering the delivery of surplus electrical energy from the power plant, was in force, and some portion of the plant was in operation the entire year to furnish energy in compliance with this contract.

During the year 943,050 kilowatt-hours of electrical energy were delivered to the city switchboard. This was an increase of 244,000 kilowatt-hours or 35 per cent over the commercial service for the previous year. The following is a statement of the results of the operations for the fiscal year:

Sale of commercial power, North Dakota pumping Project.

Month.	Cost.		Collections.		Profit.	
	Month.	Total to date.	Month.	Total to date.	Month.	Total to date.
1916.						
July	$2,076.18	$74,683.05	$2,249.00	$77,569.95	$172.82	$2,886.90
August	2,170.66	76,853.71	2,191.00	79,760.95	20.34	2,907.24
September	1,943.06	78,796.77	2,246.00	82,006.95	302.94	3,210.18
October	2,339.32	81,136.09	2,585.00	84,591.95	245.68	3,455.86
November	2,495.92	83,632.01	2,802.00	87,393.95	306.08	3,761.94
December	2,360.87	85,992.88	2,964.00	90,357.95	603.13	4,365.07
1917.						
January	2,176.65	88,169.53	2,861.00	93,218.95	684.35	5,049.42
February	2,329.17	90,498.70	2,571.00	95,789.95	241.83	5,291.25
March	2,537.89	93,036.59	2,676.00	98,465.95	138.11	5,429.36
April	2,550.48	95,587.07	2,463.00	100,928.95	[1] 87.48	5,341.88
May	2,237.03	97,824.10	2,495.00	103,423.95	257.97	5,599.85
June [2]	2,200.00	100,024.10	2,458.00	105,881.95	258.00	5,875.85

[1] Loss. [2] Cost and profit for June estimated.

In addition to the above gain the contract returned $1,430.55 which was assumed for depreciation and the cost of preparing the plant for winter operation, and $450 for plant arbitrary charges.

The increased consumption by the city during the fiscal year was due principally to the installation of the street-lighting system. Increases for the ensuing year will result from installation of machinery in one of the local coal mines and electrical pumps of the Great Northern Railway which will be operated from the plant.

OPERATION AND MAINTENANCE.

During the fiscal year 1917 the power plant, coal mine, and transmission line to Williston were operated. The water users were unable in 1916 to comply with the requirements of the Reclamation Commission that they operate the irrigation system on their own account or guarantee the full repayment of the operation and maintenance cost at the close of the irrigation year.

In April, 1917, the water users studied and discussed the existing conditions and decided that, in view of the excessive cost of labor and materials and the shortage of men on the local farms due to the war, the interests of the project would be best served by postponing

operations until the irrigation district is organized. Meanwhile the investment will be somewhat reduced and no new obligations assumed.

At the last session of the North Dakota Legislature house bill No. 75, providing for establishing irrigation districts in North Dakota, was passed. The water users expect to organize the Williston unit into an irrigation district and to operate the project on that basis in 1918.

As the fiscal year closes and the crops suffer from drouth the water users still feel that the cost of operations would have been excessive for the acreage in crop; and although the individual farmers would have profited and the local crop yield would have been increased, the project as an enterprise would have suffered materially.

Historical review, North Dakota pumping project.

WILLISTON UNIT.

Item.	1912	1913	1914	1915	1916	1917
Area for which service was prepared to supply water	8,189	8,189	8,189	8,189	8,189	8,189
Acreage irrigated	323	1,739	1,056	.....	.....	.....
Number of farms irrigated	16	54	44	.....	.....	.....
Miles of canal operated	18	32	30	.....	.....	.....
Water diverted (acre-feet)	750	3,638	2,671	.....	.....	.....
Water delivered to land (acre-feet)	278	2,288	1,792	.....	.....	.....
Water per acre of land irrigated (acre-feet)	0.66	1.31	1.70	.....	.....	.....

BUFORD-TRENTON UNIT.

Area for which service was prepared to supply water	4,049	4,049	4,049	4,049	4,049	4,049

SETTLEMENT.

Because of the suspension of irrigation operations no decided increase in settlement occurred. With a view to stimulating settlement, some tracts, notably those near the city of Williston, have been subdivided into more wieldy tracts for irrigation. Dairying has increased and with it the demand for alfalfa and the interest in resumption of irrigation.

Three farmers' clubs are active. The cooperative creamery and ice-cream factory continued to operate with increasing success. The cooperative elevator had a successful year. A potato storage warehouse was built to handle the potato crop of 1917 and subsequent years. Settlement data of the two units of the project are summarized in the following tables:

Settlement data, North Dakota pumping project.

WILLISTON UNIT.

Item.	1913	1914	1915	1916	1917
Total number of farms on project	93	101	101	101	105
Population	146	146	163	175	190
Number of irrigated farms	54	26	44	.....	.....
Operated by owners or managers	32	18	34	34	34
Operated by tenants	22	8	10	10	10
Population	162	72	140	152	155
Number of towns	2	2	2	2	2
Population	4,700	4,700	5,000	5,000	5,300
Population on farms and in towns	4,846	4,846	5,163	5,175	5,490
Number of public schools	4	4	5	5	6
Number of churches	5	5	6	6	6
Number of banks	3	3	3	3	4
Total capital stock	.....	.....	$135,000	$185,000	$235,000
Total number of depositors	.....	.....	3,000	3,300	3,500
Total amount of deposits	.....	.....	$1,300,000	$1,300,000	$1,800,000

BUFORD-TRENTON UNIT.

Total number farms on project	38	42	42	42	42
Population	69	70	70	70	70
Number of irrigated farms:					
Operated by owners or managers	10	19	19	19	19
Operated by tenants	23	23	23	23	23
Number of towns	2	2	2	2	2
Population	350	350	400	400	425
Population on farms and in towns	419	420	470	470	495
Number of public schools	1	1	2	3	3
Number of churches	2	2	2	2	2
Number of banks	1	1	2	2	2
Total capital stock	.....	$10,000	$20,000	$20,000	$20,000
Amount of deposits	.....	$100,000	$115,000	$115,000	$120,000
Number of depositors	200	200	240	240	250

PRINCIPAL CROPS.

Alfalfa continues to be the principal crop, although the acreage was somewhat reduced due to nonirrigation. Next in importance are potatoes, with which project farmers are becoming very successful. Dairying, cattle, and hog raising are the principal activities. As no lands were irrigated, no crop yield report was made.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in Appendix, p. 510.]

Feature costs of North Dakota pumping project, June 30, 1917.

Features.	Cost to June 30, 1917.
Examination and surveys	$44,969.88
Lateral system:	
Williston unit	141,292.90
Buford-Trenton unit	58,406.83
	199,699.73
Power system:	
Williston unit—	
Coal mine	14,224.61
Williston barge	39,647.14
Williston transmission line	16,439.30
Pumping substation B	8,281.60
Pumping substation A	14,065.76
Power house	176,803.30
Transformer station at barge	2,742.19
Floating boom at barge	772.64
Scow pontoon	1,411.33
Buford-Trenton unit—	
Buford-Trenton transmission line	25,345.99
Buford-Trenton barge	36,583.53
Pumping substation A	36,127.77
Boom and scow pontoon	787.60
Extension to Williston power house	76,329.36
	449,562.12
Permanent improvements:	
Williston unit	17,606.46
Buford-Trenton unit	5,850.13
	23,456.59
Operation and maintenance charges transferred to and compounded with construction charges	22,191.93
Gross construction cost to June 30, 1917	739,880.25
Less revenues earned during construction period:	
Rentals of buildings	347.16
Rentals of irrigating water	196.75
Contractors' freight refund	5,495.08
	6,038.99
Net cost of construction of project to June 30, 1917	733,841.26

Statement of cost, by calendar years, North Dakota pumping project.

Year ending Dec. 31—	Construction.	Operation and maintenance under public notice.	Total cost.
1907	$428,985.77		$428,985.77
1908	202,774.81	$34,444.47	237,219.28
1909	69,221.31	45,106.43	114,327.74
1910	12,432.17	41,915.42	54,347.59
1911	5,392.45	35,206.63	40,599.08
1912	[1] 988.70	49,650.74	48,662.04
1913	[1] 4,666.33	47,049.05	42,382.72
1914		51,114.82	51,114.82
1915	26,728.77	4,473.35	31,202.12
1916		26,014.45	26,014.45
January to June 30, 1917		14,936.35	14,936.35
Plant accounts		3,949.12	3,949.12
	739,880.25	353,860.83	[2] 1,093,741.08
Less commercial power transferred to power revenues		[1] 100,406.76	[1] 100,406.76
	739,880.25	253,454.07	993,334.32

[1] Deduct.

[2] Includes commercial power.

Statement of costs, by fiscal years, North Dakota pumping project.

Year ending June 30—	Construction.	Operation and maintenance under public notice.	Total cost.
1907	$182,924.99		$182,924.99
1908	380,539.00		380,539.00
1909	128,193.39	$55,133.54	183,326.93
1910	12,402.55	42,965.45	55,368.00
1911	9,354.13	37,633.27	46,987.40
1912	4,403.75	36,447.97	40,851.72
1913	[1] 4,961.03	58,968.25	54,007.22
1914	294.70	48,617.27	48,911.97
1915	22,191.93	20,179.98	42,371.91
1916	4,536.84	21,611.13	26,147.97
1917		28,322.20	28,322.20
Plant accounts		3,981.77	3,981.77
	739,880.25	353,860.83	1,093,741.08
Less commercial power transferred to power revenues		[1] 100,406.76	[1] 100,406.76
	739,880.25	253,454.07	993,334.32

[1] Deduct.

Estimated cost of contemplated work, North Dakota pumping project, during fiscal year 1918.

Features.	Estimated expenditures during fiscal year 1918.	
	Subfeature.	Principal feature.
Operation and maintenance under public notice:		
Commercial power	$33,300.00	
Irrigation	9,700.00	
		$43,000.00

OKLAHOMA, LAWTON PROJECT.

C. T. Pease, project manager, Lawton, Okla.

LOCATION.

County: Comanche.
Townships: 2 and 3 N., Rs. 12 and 13 W., Indian meridian.
Railroads: St. Louis & San Francisco; Chicago, Rock Island & Pacific.
Railroad station and estimated population, January 1, 1917: Lawton, Okla., 8,000.

WATER SUPPLY.

Source of water supply: Medicine Bluff and Little Medicine Bluff Creeks.
Area of drainage basin: 110 square miles.
Annual run-off in acre-feet of Medicine Bluff and Little Medicine Bluff Creeks at site of proposed diversion dam: Medicine Bluff Creek, including the run-off of Little Medicine Bluff Creek and the overflow from Lake Lawtonka, supplied by Medicine Bluff Creek, 1915, 33,405 acre-feet. The estimated natural run-off of Medicine Bluff Creek is 20,700 acre-feet, which includes the run-off at the proposed diversion dam plus the amount of water used by the city of Lawton and Fort Sill and the evaporation on the reservoir.
Reservoir: Storage capacity of top 20 feet of Lake Lawtonka, which was built by the city of Lawton, Okla., for domestic use. The reservoir has a total capacity of 14,000 acre-feet and covers an area of 1,082 acres. The reservoir is formed by a 50-foot masonry dam, which stores the waters of Medicine Bluff Creek, and it is estimated that the capacity of the top 20 feet, which the city of Lawton agreed to donate to the Government, is 12,000 acre-feet.
Irrigable area: Approximately 2,500 acres under present plan.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Length of irrigation season: April 1 to October 31—214 days.
Average elevation of irrigable area: 1,100 feet above sea level.
Rainfall on irrigable area: 30 years, average 31 inches; at Lawton, Okla., 1915, 39.8 inches.
Range of temperature on irrigable area: 10° to 110° F.
Character of soil on irrigable area: Clay loam; rolling.
Principal products: Garden truck, melons, tomatoes, cabbage, onions, sweet potatoes, berries, fruit, forage crops, and cotton.
Principal markets: Lawton and Oklahoma City, Okla.; Kansas City and St. Louis, Mo.; Galveston, Tex.; and New Orleans, La.

CHRONOLOGICAL SUMMARY.

Reconnoissance authorized by secretary April 29, 1912.
Reconnoissance begun June 12, 1912.
Gaging stations were established at Lake Lawtonka and on Little Medicine Bluff and Medicine Bluff Creeks during the summer of 1912 and an evaporation raft placed on Lake Lawtonka. Arrangements were made with the United States Geological Survey to rate the streams and keep records of rainfall, evaporation, and run-off. An automatic gaging station was placed in Medicine Bluff Creek in the winter of 1914.
An allotment of $100,000 was approved by the Secretary of the Interior on January 24, 1914, for the construction of the project under certain conditions. These included the formation of an acceptable water users' association, the subscription of about 1,900 acres of irrigable land in a compact body close to the 600 acres of Indian school land to be included, and agreement for division of holdings into small farms.
On August 1, 1914, an act of Congress was passed authorizing the inclusion of 600 acres of Indian school land in the project.
An office was opened at Lawton, Okla., and surveys begun in August, 1914, by Mr. P. M. Fogg, engineer, and continued to February, 1915, when work was discontinued.

In October, 1914, a soil examination was made of the irrigable area of the project. The resultant report was favorable as to the effect of irrigation on the soils.

During the calendar year 1915 the water users' association secured subscription of stock covering 1,800 acres of land, but the tracts subscribed did not form a sufficiently compact body to permit economical irrigation.

Early in 1916 it was determined to form an irrigation district under the laws of Oklahoma and enter into a contract for the construction of irrigation works to serve approximately 2,500 acres of private lands.

The office at Lawton was reopened May 15, 1916, and closed October 31, 1916. During this period a small amount of topographic work was done. The greater part of the time was spent in assisting in the formation of an irrigation district. The office at Lawton was again opened June 1, 1917, in anticipation that construction of the project would be proceeded with, but owing to the establishment of a large cantonment at Fort Sill by the War Department requiring all the available water supply operations were deferred and the office closed June 18, 1917.

IRRIGATION PLAN.

The irrigation plan for the Lawton project provides for the storage of the water of Medicine Bluff Creek in the Lawton Reservoir, or Lake Lawtonka, the top 20-foot capacity of which has been donated to the Government by the town of Lawton for this use, and the direct diversion of the water of Little Medicine Bluff Creek, a diversion dam in Medicine Bluff Creek and distribution of the water through a canal approximately 7 miles long, irrigating about 2,500 acres in the vicinity of Lawton, Okla. The area to be irrigated has not been definitely selected at this time, but will be adjacent to about 600 acres of Indian land north of Lawton.

SUMMARY OF GENERAL DATA FOR LAWTON PROJECT TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is completed		2,500
Private land		2,500
Finances:		
Gross construction cost to end of fiscal year		$13,645.95
Appropriated for fiscal year 1918, total		$101,000.00
Allotment for construction, fiscal year 1918		$500.00
Proposed appropriation, fiscal year 1919, for investigations		$1,000.00
Estimated gross construction expenditures to June 30, 1919		$15,145.95
Appropriation, fiscal year 1917		[1] $51,140.50
Expenditures during fiscal year, chargeable to 1917 appropriation—		
Disbursements	$2,293.87	
Transfers	380.82	
	$2,674.69	
Registered liabilities chargeable to 1917 appropriation	245.81	
		2,920.50
Unencumbered balance, July 1, 1917		48,220.00

[1] Includes refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix, p. 512.]

Feature costs of Lawton project to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys	$3,637.52	$8,661.94
Canal system	[1] 548.29	.....
Diversion dam	.....	293.80
Main canal	.....	2,080.68
	[1] 548.29	2,374.48
Lateral system	[1] 580.62	1,118.83
Plant accounts	452.58	452.58
Undistributed general expense	1,038.12	1,038.12
Gross construction cost to June 30, 1917	3,999.31	13,645.95
Less revenues earned during construction period, profit on hospital operations	.75	9.75
Net cost of construction of project to June 30, 1917	.....	13,636.20

[1] Deduct.

Statement of cost by calendar years, Lawton project.

Year ending Dec. 31—	Construction.	Total cost.
1914	$5,830.30	$5,830.30
1915	2,339.98	2,339.98
1916	3,830.54	3,830.54
January to June 30, 1917	1,645.13	1,645.13
Total	13,645.95	13,645.95

Statement of cost by fiscal years, Lawton project.

Year ending June 30—	Construction.	Total cost.
1914	$450.65	$450.65
1915	7,447.10	7,447.10
1916	1,748.89	1,748.89
1917	3,999.31	3,999.31
Total	13,645.95	13,645.95

Estimated cost of contemplated work, Lawton project, during fiscal year 1918.

Features: Examination and surveys, and hydrometry, $500.

OREGON, UMATILLA PROJECT.

H. D. NEWELL, project manager, Hermiston, Oreg.

LOCATION.

Counties: Umatilla and Morrow.
Townships: 4 and 5 N., Rs. 24, 25, 26, 27, 28, and 29 E., Willamette meridian.
Railroads: Oregon-Washington Railroad & Navigation Co.; Spokane, Portland & Seattle R. R.
Railroad stations and estimated population January 1, 1917: Hermiston, 650; Umatilla, 200.

WATER SUPPLY.

Source of water supply: Umatilla River.
Area of drainage basin: 2,160 square miles.
Annual run-off in acre-feet: Umatilla River at Yoakum (1,200 square miles), 1903 to 1916, maximum, 723,000; minimum, 250,000; mean, 489,000.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which Service is prepared to supply water, season of 1917: 24,000 acres.
Area under water-right applications, season of 1917: 16,260 acres.
Length of irrigation season: From March 20 to October 16—210 days.
Average elevation of irrigable area: 470 feet above sea level.
Rainfall on irrigable area: Average, 8.8 inches: 1916, 12.2 inches.
Range of temperature on irrigable area: —28° to 115° F. (ordinary minimum, 0° F.)
Character of soil, irrigable area: Sandy loam.
Principal products: Alfalfa, fruits, berries, vegetables.
Principal markets: Portland, Oreg., and Spokane, Wash.

LANDS OPENED FOR IRRIGATION.

Dates of public notices and orders: December 27, 1907; August 3 and November 12, 1908; April 3, 1909; January 6, 1910 (two); February 28 and May 16, 1911; March 2 and May 8, 1912; March 3, April 7, June 23, July 15, and July 21, 1913; January 19 and September 24, 1914; February 25, April 5, and December 12, 1915 (two); March 16, April 12 (three), May 12, May 27, September 21, December 18, 1916; January 2, January 5, February 8, February 23, March 23, April 20, and April 23, 1917.
Location of lands opened: Ts. 4 and 5 N., Rs. 24, 25, 26, 27, 28, and 29 E., Willamette meridian.
Present status of irrigable area opened: 3,812 acres entered subject to reclamation act; 1,196 acres open to entry; 19,239 acres private land.
Limit of area of farm units: Public, 40 acres; private, 160 acres.
Duty of water: 2.8 acre-feet per acre per annum at the farm.
Building charge per acre of irrigable land: $60, $70, and $92.
Annual operation and maintenance charge: Varying with quantity of water used.

CHRONOLOGICAL SUMMARY.

Reconnoissance and preliminary surveys begun in 1903.
Construction recommended by board of engineers October 27, 1905.
Construction authorized by Secretary December 4, 1905.
Diversion dam and feed canal completed August, 1907.
Cold Springs Dam completed June, 1908.
First irrigation by Reclamation Service season of 1908.
Construction of west extension authorized December 22, 1913.
West Extension (Three Mile Falls) Diversion Dam completed November 28, 1914.
West Extension Main Canal completed June, 1916.
Entire project (including west extension) 85 per cent completed June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the Umatilla project provides for the diversion of water from the Umatilla River above Echo, Oreg., through a feed canal 24.5 miles long, into a storage reservoir. Water is diverted from the reservoir through an outlet canal, also from the feed canal by means of a by-pass connecting the feed and outlet canals. Water is also diverted from the Umatilla River by the Maxwell Canal, heading near Butter Creek, and delivered into a distribution system from the reservoir, thus watering land in the Umatilla and Columbia River Valleys near Hermiston, Oreg. In addition some 10,000 acres bordering the Columbia River in the vicinity of Umatilla and Irrigon, Oreg., will be watered by a canal diverting from the Umatilla River about halfway between Hermiston and Umatilla.

The United States intends, for and in connection with the project, to use the waste, seepage, spring, and percolating water arising within the same, and asserts a right thereto by virtue of its reservation of all unappropriated waters of the project source of supply and of its appropriation of said waters in accordance with the State law, heretofore made, for the purpose of the project.

The features which have been completed are the diversion works above Echo, feed canal, Cold Springs Dam, by-pass, diversion works for the Maxwell Canal, diversion works for the west extension, main distributary from Cold Springs Reservoir, main distributary for the west extension, and laterals for the irrigable area now opened. Four drain ditches have been built. The main construction work in progress is the building of laterals for the west extension.

SUMMARY OF GENERAL DATA FOR UMATILLA PROJECT TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is complete		36,300
Public land entered to end of fiscal year	3,812	
Public land open to entry at end of fiscal year	1,196	
Public land withdrawn at end of fiscal year	2,762	
Private land	28,530	
Acreage service could have supplied season of 1916		19,000
Addition in fiscal year 1917		5,000
Estimated addition in fiscal year 1918		2,000
Estimated acreage service can supply July 1, 1918		26,000
Acreage actually irrigated, season of 1916		5,477
Acreage cropped under irrigation, season of 1916		3,900
Crops:		
Value of irrigated crops, season of 1916		[1] $139,800
Value of irrigated crops, per acre cropped		[1] $35.84
Finances:		
Gross construction cost to end of fiscal year		$2,347,941.32
Per cent complete at end of fiscal year		85
Appropriated for fiscal year 1918, total		$157,000.00
Allotment for construction, fiscal year 1918		$84,400.00
Estimated per cent complete, June 30, 1918		88
Proposed appropriation, fiscal year 1919, for construction		$35,000.00
Estimated gross construction expenditures to June 30, 1919		$2,467,341.32
Estimated per cent complete, June 30, 1919		90
Announced construction charges per acre		$60, $70 and $92
Appropriation, fiscal year 1917		[2] $245,767.78
Expenditures during fiscal year, chargeable to 1917 appropriation		
Disbursements	$195,110.28	
Transfers	142.99	
	$195,253.27	
Registered liabilities chargeable to 1917 appropriation	12,352.57	
		207,605.84
Unencumbered balance, July 1, 1917		38,161.94

[1] Exclusive of west extension, for which data are not available.
[2] Includes refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

Repayments:	
Construction charges—	
Accrued to end of fiscal year	$209,850.40
Collected to end of fiscal year	193,324.00
Uncollected at end of fiscal year	16,526.40
Operation and maintenance charges (public notice):	
Accrued to end of fiscal year	102,305.84
Collected to end of fiscal year	85,467.02
Uncollected at end of fiscal year	16,838.82
Water-rental charges—	
Accrued to end of fiscal year	13,455.60
Collected to end of fiscal year	12,932.19
Uncollected at end of fiscal year	523.41
Drainage:	
Estimated acreage damaged by seepage to end of fiscal year	200
Miles of drains built to end of fiscal year—open	10
Estimated acreage protected by drains built to end of fiscal year	2,000
Estimated acreage to be protected by authorized system	2,000
Cost of drainage works to end of fiscal year	$57,145.53

CONSTRUCTION DURING FISCAL YEAR.

Feed Canal.—About 20 miles of the Feed Canal were widened from 5 to 6 feet; 162,150 cubic yards of class 1, 4,813 cubic yards of class 2, and 4,037 cubic yards of class 3 material were moved. In addition 350 cubic yards or 4,200 square yards of concrete lining, 3 inches thick were placed at various bridge and flume crossings.

Distribution system.—Nine thousand eight hundred and sixty-eight linear feet of small laterals were built and lined with concrete 2 inches thick; and 2,807 linear feet of 16-inch and 6,777 linear feet of 20-inch cement pipe were laid, nearly all of which was supplemental construction included within nine small districts. The foregoing required 8,400 cubic yards of class 1 excavation and the placing of 765 cubic yards of concrete, 72 small canal structures being built. In addition the Maxwell Canal was widened from 2 to 7 feet throughout the greater portion of its length. The work involved the excavation of 17,285 cubic yards of class 1, 3,075 cubic yards of class 2, and 205 cubic yards of class 3 material; and the lining of 883 linear feet of canal with concrete 2 inches thick. The spillway crest was enlarged and a fish screen placed, involving the laying of 129 cubic yards of concrete.

West extension.—About 13.19 miles of laterals were built and lined with concrete 2 inches thick; 6,151 linear feet of concrete pipe and 3,033 linear feet of wood pipe were laid. The concrete pipe included 1,282 linear feet of 16-inch, 4,326 linear feet of 20-inch, and 543 linear feet of 24-inch pipe; the wood pipe 908 linear feet of 24-inch and 2,125 linear feet of 30-inch inserted joint machine banded wood pipe. One hundred and thirty-six canal structures were placed, mostly small concrete turnouts. The work involved the excavation of 69,500 cubic yards of class 1 and 218 cubic yards of class 3 material; and the placing of 4,133 cubic yards of concrete.

OPERATION AND MAINTENANCE.

Diversion of water to the Feed Canal for storage purposes was resumed December 20, 1916, and was continued until June 30, 1917. The Cold Springs Reservoir was substantially full early in April, so the flow in the Feed Canal for storage purposes was cut out from April 3 to May 7. Forty-eight thousand acre-feet were diverted for storage purposes, of which 43,900 acre-feet reached the reservoir. Available storage on June 30, 1917, was 42,450 acre-feet. Delivery of water to the distribution system began on March 20; the total discharge from the reservoir to June 30 was 13,460 acre-feet. Delivery of water to the Maxwell Canal began on April 9; the total diversion to June 30 amounted to 9,800 acre-feet. The area of irrigable holdings on that portion of the project east of the Umatilla River is estimated to be 11,000 acres, and the area actually irrigated 6,000 acres.

West extension.—Diversion of water for irrigation purposes began on April 1, although prior to that date water was in the canal. About 700 acres have been irrigated, mainly land having a vested water right from the system of the Oregon Land & Water Co. To June 30, 1,740 acre-feet had been delivered to water users.

Historical review, Umatilla project.

Item.	1912	1913	1914	1915	1916	1917, estimated.
Acreage for which service was prepared to supply water	17,252	18,300	17,587	16,000	19,000	24,000
Miles of canal operated	112	112	112	112	163	165
Acreage irrigated	4,600	5,000	5,100	5,300	5,477	7,000
Water diverted (acre-feet)	90,000	81,500	59,900	86,200	93,000	109,500
Water delivered to land (acre-feet)	38,000	42,250	36,300	29,550	34,380	30,500
Per acre of land irrigated (acre-feet)	8.20	8.45	7.10	5.57	5.00	4.36

SETTLEMENT.

The population of the project in 1916 was 2,200, about 650 living in the corporate limits of the town of Hermiston. On February 8, 1917, public notice issued announcing the opening of the second unit of the west extension, which includes about 2,947 acres of irrigable land. Thirty tracts of public land were filed upon in the first and second units of the west extension during the year. The Northern Pacific Co. placed about 240 acres of land on the market at prices of $20 an acre and less. Practically every tract has been sold.

On February 23 public notice issued announcing the opening of the sixth unit on the East Side, including approximately 1,120 irrigable acres, only 140 of which were public land. One farm unit out of a total of four has been entered.

Settlement data, Umatilla project.

Item.	1915	1916	1917 (estimated).
Total number of farms on project	[1] 542	[1] 715	[1] 800
Population	721	975	1,100
Number of irrigated farms	306	364	431
Operated by owners or managers	178	216	260
Operated by tenants	128	148	171
Population	721	975	1,100
Number of towns	2	4	5
Population	850	1,225	1,250
Population in towns and on farms	1,571	2,200	2,350
Number of schools (public)	4	6	7
Number of churches	4	9	9
Number of banks	1	1	1
Total capital stock	$25,000	$25,000	$25,000
Total amount of deposits	$85,000	$99,000	$157,000
Total number of depositors	600	845	963

[1] Number of water-right applications and rental contracts.

PRINCIPAL CROPS.

During 1916 approximately 5,500 acres were irrigated and approximately 4,000 acres cropped, the difference being mainly nonbearing orchards and new seedings of alfalfa. The total value of crops was $139,800, as compared with $104,600 during 1915. The year was very favorable for the main crop, alfalfa. Late frosts and sustained low temperatures during the spring months resulted in a complete failure of the peach and pear crops, and yields of watermelons, corn, and potatoes were greatly lessened. The maturing of several orchards increased the apple crop materially. There were marked increases in unit and total crop values due to the prevailing high prices.

The agricultural situation for 1917 is promising. There will be excellent fruit yields. A heavy crop of alfalfa will be harvested. Prices will be high. The spring months were favorable for new seedings. A marked increase in the irrigated and cropped areas will be realized, due to increased settlement.

Crop report, Umatilla project, Oregon, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yield.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa	2,985	Ton	11,412	3.8	$9.60	$109,555	$36.70
Alfalfa seed	8.5	Bushel	26.2	3.1	14.75	386	45.46
Apples	209	Pound	310,262	1,481	.023	7,136	34.06
Corn	100	Bushel	2,753	27.3	1.00	2,753	27.31
Corn fodder	100	Ton	322	3.2	4.54	1,462	14.62
Clover hay, red	1.5	do	5.5	3.7	10.00	55	36.67
Clover seed, sweet	20	Bushel	250	12.5	10.80	2,700	135.00
Cantaloupes	.5	Crate	50	100	1.15	58	115.00
Garden	20.5					2,775	135.37
Hay, other	65.6	Ton	100	1.5	9.13	913	13.92
Miscellaneous	60					1,863	31.36
Onions	.8	Bushel	342	427.5	1.03	352	440.32
Peaches [1]	30.3						
Pears [1]	7.5						
Potatoes	41	Bushel	3,234	78.9	.92	2,975	72.57
Pasturage	612					4,023	6.57
Small fruits	36					1,398	38.51
Vetch seed	2	Bushel	4.2	2.1	11.90	50	24.99
Watermelons	34	Ton	86	2.5	15.66	1,347	39.61
Less duplicated areas	435						
Total cropped	3,900	Total and average				139,800	35.84

[1] Crop failure.

Crop report, Umatilla project, Oregon, year of 1916—Continued.

Crop.	Area (acres).	Areas.	Acres.	Farms.	Per cent of project.[1]
Irrigated, no crop:					
Fall plowed	59	Total irrigable area farms reported	10,229	320	60.2
Miscellaneous	248	Total irrigated area farms reported	5,476.6	320	32.2
New alfalfa	567	Under water-right applications	4,179.6	242	24.6
Nonbearing orchards	725	Under rental contracts	289	10	1.7
Less duplicated areas	22	Miscellaneous[2]	1,008	75	5.9
Total irrigated	5,477	Total cropped area farms reported	3,900.2	320	22.9

[1] Based on 17,000 acres.
[2] Sandy area, 708.8 acres; maximum water rights, 226.2 acres; vested water rights, 35 acres; under dept. eg 38 acres; 7 farms partly water right and other contract.

PUBLIC NOTICES AND ORDERS.

PUBLIC NOTICE, SEPTEMBER 21, 1916.

1. Under the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplementary thereto, particularly section 4 of the reclamation extension act of August 13, 1914 (38 Stat., 686), it appears that a majority of the water-right applicants in district No. 6 of the Umatilla project have made agreements providing for an increase in the cost of construction in the sum of $14 per irrigable acre for the construction of a concrete-lined canal about 2,700 feet long, a 20-inch cement pipe line about 320 feet long, a concrete-lined canal about 1,100 feet long, and a 20-inch cement pipe line about 1,700 feet long, and certain incidental connecting structures, whereby water may be delivered approximately to each 40-acre subdivision within the district, which will involve a total cost of approximately $4,900, or not to exceed $14 per irrigable acre of land. The said agreements are hereby ratified, and the said increase in the construction charge is hereby made effective in accordance with the conditions of the said contracts, as hereinafter specified.

2. The lands in the district are described as follows:

T. 5 N., R. 29 E., W. M.—Section 28, S. ½ SW. ¼; section 29, SE. ¼, SE. ¼; section 32, E. ½ NE. ¼, E. ½ SW. ¼ NE. ¼, NE. ¼ SE. ¼, E. ½ NW. ¼ SE. ¼, N. ½ SE. ¼ SE. ¼; section 33, NW. ¼ NW. ¼, N. ½ SW. ¼ NW. ¼.

3. Such increased charge of $14 per acre shall be added to the construction charge and be paid in additional annual installments after the last of the installments now payable under the reclamation extension act, being two annual installments of $5 each per irrigable acre and one final installment at $4 per irrigable acre.

4. Payments for the increased charge shall be applicable to all of the lands hereinabove described.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

PUBLIC NOTICE, DECEMBER 18, 1916.

1. Under the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof, and supplementary thereto, particularly section 4 of the reclamation extension act of

August 13, 1914 (38 Stat. 686), it appears that a majority of the water-right applicants in district No. 7 of the Umatilla project have made agreements providing for an increase in the cost of construction in the sum of $14 per irrigable acre for the construction of a concrete-lined canal about 1,300 feet long, a 20-inch cement pipe line about 1,340 feet long, and certain incidental connecting structures, whereby water may be delivered to commanding points within the district, which will involve a cost of not to exceed $14 per irrigable acre of land. The said agreements are hereby ratified and the said increase in the construction charge is hereby made effective in accordance with the conditions of the said contracts as hereinafter specified.

2. The lands in the district are described as follows:

T. 4 N. R. 29 E., W. M.—Section 5, that portion of the NW. ¼ NW. ¼ lying north of Canal L.

T. 5 N. R. 29 E., W. M.—Section 32, W. ½ of farm unit C in SW. ¼; W. ½ of farm unit D in SW. ¼; section 31, SE. ¼ SE. ¼ N. ½. SW. ¼ SE. ¼.

That portion of the N. ½ SE. ¼ described as follows: Beginning at the southeast corner of the N. ½ SE. ¼; thence westerly along the south boundary of said N. ½ SE. ¼ 1,980 feet; thence north 330 feet; thence N. 63° 26′ E. 2,214 feet to the northeast corner of said N. ½ SE. ¼; thence south along the east boundary of said N. ½ SE. ¼ 1,320 feet to the point of beginning.

3. Such increased charge of $14 per acre shall be added to the construction charge and be paid in additional annual instalments after the last of the instalments now payable under the reclamation extension act, being two annual instalments of $4.50 each per irrigable acre, and one final instalment at $5.00 per irrigable acre.

4. Payments for the increased charge shall be applicable to all of the lands hereinabove described.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

PUBLIC NOTICE, JANUARY 2, 1917.

1. Under the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof, and supplementary thereto, particularly section 4 of the reclamation extension act of August 13, 1914 (38 Stat., 686), it appears that all of the water-right applicants in district No. 9 of the Umatilla project have made agreements providing for an increase in the cost of construction in the sum of $14.50 per irrigable acre for the construction of a 20-inch cement pipe line about 1,280 feet long, whereby water may be delivered to commanding points within the district, which will involve a cost of not to exceed $14.50 per irrigable acre of land. The said agreements are hereby ratified and the said increase in the construction charge is hereby made effective in accordance with the conditions of said contracts as hereinafter specified.

2. The lands in the district are described as follows:

T. 4 N., R. 29 E., W. M.—Section 6, W. ½ lot 2 in NW. ¼ south of a line drawn parallel to and 560 feet from the south boundary of said lot 2, also W. ½ lot 1 in NW. ¼.

3. Such increased charge of $14.50 per acre shall be added to the construction charge and be paid in additional annual instalments

after the last of the instalments now payable under the reclamation extension act, being two annual instalments of $4.50 each per irrigable acre, and one final instalment of $5.50 per irrigable acre.

4. Payments for the increased charge shall be applicable to all of the lands hereinabove described.

ALEXANDER T. VOGELSANG.
First Assistant Secretary of the Interior.

PUBLIC NOTICE, JANUARY 5, 1917.

1. In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof, and supplemental thereto, and particularly the reclamation extension act of August 13, 1914 (38 Stat., 686), public notice for lands in private ownership in the first unit of west extension, Umatilla project, Oregon, is hereby issued as follows:

2. *Lands for which water will be furnished.*—Upon proper application, water will be furnished under said project in the irrigation season of 1917 and thereafter, for the irrigable lands in private ownership in the first unit of west extension, shown on farm unit plats of the following townships of the Willamette meridian, to wit: T. 4 N., R. 24 E.; T. 4 N., R. 25 E.; T. 4 N., R. 26 E.; T. 5 N., R. 27 E.; which plats were approved March 23, 1916, by First Assistant Secretary of the Interior and are on file in the office of the project manager, United States Reclamation Service, Hermiston, Oreg., and in the local land offices at La Grande, Oreg., and The Dalles, Oreg.

3. *Limit of area for which water right may be secured.*—The maximum limit of area for which water-right application may be made for said lands in private ownership shall be 160 acres of irrigable land for each landowner.

4. *Applications for water rights.*—All water-right applications must be made to the project manager, United States Reclamation Service, Hermiston, Oreg., upon forms provided for that purpose, and may be made on and after the date upon which this notice becomes effective as herein prescribed.

5. *Classes of charges for water rights.*—The water-right charges are of two classes, to wit: (*a*) a charge against each irrigable acre to cover the cost of construction of the irrigation system; and, (*b*) an annual charge against each irrigable acre to cover the cost of operation and maintenance of the system. All such charges must be paid at the office of the United States Reclamation Service at Hermiston, Oreg., by New York draft or money order, payable to special fiscal agent, United States Reclamation Service, or in currency.

6. *Construction charges.*—The construction charge for said lands shall be $92 per irrigable acre, payable as follows:

(*a*) For lands that were, prior to August 13, 1914, subjected by contract, trust deed, decree of court, or otherwise, to the provisions of the reclamation law, said construction charge shall be paid in 10 equal annual instalments, the first of which shall be paid at the time of filing water-right application, the second of which shall be paid December 1 of the following year, and subsequent instalments shall be paid December 1 of each year thereafter; *Provided*, That if water-

right application subject to the provisions of the reclamation extension act of August 13, 1914, or an acceptance of the provisions of said extension act in accordance with section 14 thereof, be filed within six months from the date upon which this notice becomes effective, said construction charge shall be payable in 20 instalments, the first of which shall become due and payable on December 1 following the date of water-right application, and subsequent instalments on December 1 of each year thereafter, in which event the first four instalments shall each be 2 per centum, the next two instalments shall each be 4 per centum, and the next 14 each 6 per centum of the total construction charge.

(*b*) For the remaining lands in private ownership an initial payment of 5 per cent of the construction charge shall be made at the time of filing water-right application, and the remainder of the construction charge shall be paid in 15 annual installments, the first five of which shall each be 5 per cent and the remainder each 7 per cent of the total construction charge. The first of said 15 annual installments shall become due and payable December 1 of the fifth calendar year after the initial installment, and subsequent installments shall become due and payable on December 1 of each calendar year thereafter: *Provided,* That any water-right applicant may, at his option, pay in advance the whole or any part of the construction charges owing by him within any shorter period than that prescribed by this notice.

7. *Increased construction charges in certain cases.*—In all cases where water-right application for lands in private ownership, as shown on said farm-unit plats, shall not be made within one year after the date upon which this notice becomes effective, the construction charge for such lands shall be increased 5 per cent each year until such application is made and the initial installment paid.

8. *Operation and maintenance charges.*—The operation and maintenance charge for the irrigation season of 1917 shall be $1.50 per acre of irrigable land whether water is used thereon or not, which will entitle the water user to 4 acre-feet of water per irrigable acre. Additional water supply will be furnished at the rate of 15 cents per acre-foot. The operation and maintenance charges of future years will be duly announced. All such charges will be payable on March 1 of each year for the preceding irrigation season, except that when original water-right application is filed after June 15 in any year the first payment of such charge becomes due March 1 of the second year thereafter.

9. *When notice is effective.*—This notice shall become effective on March 1, 1917, and shall be in full force and effect on and after that date, and shall be a substitute for the public notice of May 12, 1916, except as to public lands and those lands in private ownership for which water-right application has heretofore been made under that notice.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

PUBLIC NOTICE, FEBRUARY 8, 1917.

1. In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplemental thereto, and particularly the reclamation extension act of August 13,

1914 (38 Stat., 686), public notice for the second unit of the west extension, Umatilla project, Oreg., is hereby issued, as follows:

2. *Lands for which water will be furnished.*—Upon proper application being made therefor, water will be furnished under said project in the irrigation season of 1917, and thereafter, for the irrigable lands of the said second unit shown on the farm-unit plats of the following townships of the Willamette Meridian, to wit: T. 4 N., R. 24 E.; T. 4 N., R. 26 E.; T. 4 N., R. 25 E.; T. 5 N., R. 26 E.; T. 5 N., R. 28 E., which plats were approved by the Secretary of the Interior on February 5, 1917, and are on file in the office of the project manager, United States Reclamation Service, Hermiston, Oreg., and the local land offices at La Grande, Oreg., and The Dalles, Oreg.

3. *When and how to make entry for public land.*—Homestead entries for the farm units shown on said plats embracing public lands of the United States may be made beginning March 6, 1917, at 9 o'clock a. m., at the local land office of the district within which said land is situated. Every person desiring to acquire any of said public lands must execute a homestead application subject to the provisions of the reclamation law in manner required by law, which, with the required fees and commissions, accompanied by certificate of the project manager as to the filing of water-right application and payment of water-right charges as hereinafter provided, may be presented to said local land office, in person, by mail, or otherwise, within a period of five days prior to the opening, to wit: On and from March 1, 1917, to and including 9 o'clock a. m., March 6, 1917. Applications presented after 9 o'clock a. m., March 6, 1917, will be filed and noted in the order of their receipt. Any applications not based on a prior settlement right will be subject to valid settlement claims asserted in the manner required by law.

4. *Simultaneous filings for public land.*—Applications reaching said local land offices during said period of five days will be held and treated as simultaneously filed, and the register and receiver will dispose of them as follows:

(*a*) Where there is no conflict the application will be allowed, irrespective of whether settlement is alleged.

(*b*) In case of conflicting applications and only one of the applicants alleges prior settlement, his application will be allowed and the others rejected.

(*c*) If two or more conflicting applications, each containing allegations of prior settlement, are received, a hearing, restricted to those alleging such right, will be ordered to determine the priority of right.

(*d*) Where there are conflicting applications in which no one of the several applicants claims prior settlement the register and receiver will write on cards the names of the several applicants, and each of these cards will be placed in an envelope upon which there is no distinctive or identifying mark, and at 2 o'clock p. m., on the date of opening to entry, if practicable (if not, at the same hour one day later), after all the envelopes containing the names of the several applicants shall have been thoroughly mixed in the presence of such persons as may desire to be present, they will be drawn and numbered in order. The cards as drawn and numbered will be securely fastened to the applications of the respective persons, and the applica-

tions will be allowed in such order. Applications conflicting in whole with those previously allowed will be rejected in the usual manner.

5. *Failure of applicant to obtain public land applied for.*—Where any applicant fails to obtain land applied for by him he will be permitted to elect whether he will amend his application to embrace other lands not affected by pending applications and otherwise subject thereto when such amended application is presented, or withdraw his original application without prejudice. In the event of such withdrawal the fees and commissions will be returned by the receiver, and the water-right charges deposited will be returned by the project manager upon surrender of the certificate of filing issued by the project manager.

6. *Warning against unlawful settlement upon public land.*—No person will be permitted to gain or exercise any right whatever under any settlement or occupation of any of said public lands, begun at or prior to 9 a. m, March 6, 1917: *Provided, however,* That this shall not affect any valid existing right obtained by settlement or entry while the land was subject thereto.

7. *Limit of area for which water right may be secured.*—The limit of area per entry representing the acreage which, in the opinion of the Secretary of the Interior, may be reasonably required for the support of a family upon such lands, is fixed as shown upon the plats for the several farm units. The maximum limit of area for which water-right application may be made for lands in private ownership shall be 160 acres of irrigable land for each land owner.

8. *Application for water right.*—All water-right applications, whether for public or private lands, must be made to the project manager, United States Reclamation Service, Hermiston, Oreg., upon forms provided for that purpose and may be made on and after the date upon which this notice becomes effective as herein prescribed. In the case of public lands, each water-right application must be for a specified farm unit, and more than one person may make such application for the same farm unit. A certificate of filing will be issued each applicant by the project manager. Filing of water-right application and issuance of certificate give no preference right to entry on public lands. Only when the project manager is notified by the local land office that an entry has been allowed, will acceptance of the water-right application be indorsed thereon. Whereupon all other water-right applications affecting the farm unit in question, with payments made, will be returned to the respective applicants, upon surrender by them of the certificates of filing issued by the project manager.

9. *Classes of charges for water rights.*—The water-right charges are of two kinds, to wit, (1) a charge against each irrigable acre to cover cost of construction of the irrigation system; and (2) an annual charge against each irrigable acre to cover cost of operation and maintenance of the system.

10. *Construction charge.*—The construction charge shall be $92 per acre of irrigable land, payable as follows:

(*a*) For lands that were entered prior to August 13, 1914, subject to the reclamation act, or prior to that date were subjected by contract trust deed, decree of court or otherwise to the provisions of the reclamation law, said construction charge shall be paid in not more than 10 equal annual installments, the first of which shall be paid

at the time of filing water-right application, the second of which shall be paid December 1 of the following year, and subsequent installments shall be paid December 1 of each year thereafter; provided, however, that if water-right application subject to the provisions of said reclamation extension act, or an acceptance of the provisions of same in accordance with section 14 thereof, be filed within six months from the date upon which this notice becomes effective, said construction charge shall be payable in 20 annual installments, the first of which shall become due and payable on December 1 following the date of water-right application, and subsequent installments on December 1 of each year thereafter, in which event the first four installments shall each be 2 per cent, the next two installments shall each be 4 per cent, and the next 14 each 6 per cent of the total construction charge.

(*b*) For the remaining lands an initial payment of 5 per cent of the construction charge shall be made at the time of filing water-right application, and the remainder of the construction charge shall be paid in 15 annual installments, the first five of which shall each be 5 per cent and the remainder each 7 per cent of the total construction charge. The first of said 15 annual installments shall become due and payable December 1 of the fifth calendar year after the initial installment, and subsequent installments shall become due and payable on December 1 of each calendar year thereafter.

11. *Increased construction charge in certain cases.*—In all cases where water-right application for lands in private ownership or for lands under entries not subject to the reclamation law shall not be made within one year from the date upon which this notice becomes effective, the construction charge for such lands shall be increased 5 per cent each year until such application is made and an initial installment is paid.

12. *Advance payment of construction charge permissible.*—Any water-right applicant may, at his option, pay in advance the whole or any part of the construction charge owing by him within any shorter period than that prescribed by this notice.

13. *Operation and maintenance charge.*—The operation and maintenance charge for the irrigation season of 1917 and thereafter until further notice, shall be $1.50 per acre of irrigable land whether water is used thereon or not, which will entitle the water user to 4 acre-feet of water per irrigable acre. Additional water supply will be furnished at the rate of 15 cents per acre-foot. All such charges will be payable on March 1 of each year for the preceding irrigation season, except that when water-right application is filed for public lands entered after June 15 in any year the first payment of such charge becomes due March 1 of the second year thereafter.

14. *Place and method of payment of water-right charges.*—All water-right charges must be paid at the office of the United States Reclamation Service at Hermiston, Oreg., in cash, or by New York draft, or money order, payable to the special fiscal agent, United States Reclamation Service.

15. *When notice is effective.*—This notice shall become effective on March 1, 1917, and shall be in full force and effect on and after that date.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

PUBLIC NOTICE FEBRUARY 23, 1917.

1. In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplementary thereto, and particularly the reclamation extension act of August 13, 1914 (38 Stat., 686), public notice for the sixth unit of the Umatilla project, Oregon, is hereby given as follows:

2. *Lands for which water will be furnished.*—Water will be furnished under said project in the irrigation season of 1917, and thereafter, for the irrigable lands of the sixth unit shown on the farm unit plat of the following township of the Willamette meridian, to wit, Twp. 5 N., R. 28 E., which plat was approved by the Secretary of the Interior on February 23, 1917, and is on file at the local land office at La Grande, Oreg., and at the office of the project manager, United States Reclamation Service, at Hermiston, Oreg.

3. *When and how to make entry for public land.*—Homestead entries for the farm units shown on said plat embracing public lands of the United States may be made on and after March 15, 1917, at 9 o'clock a. m., at said local land office at La Grande, Oreg. Every person desiring to acquire any of said public lands must execute a homestead application subject to the provisions of the reclamation law in manner required by law, which, with the required fees and commissions, accompanied by certificate of the project manager as to the filing of water-right application and payment of water-right charges as hereinafter provided, may be presented to said local land office, in person by mail, or otherwise, during a period of five days prior to the opening, to wit: On and from March 10, 1917, to and including 9 o'clock a. m., March 15, 1917. Applications presented after said period of five days will be filed and noted in the order of their receipt. Any application not based on a prior settlement right will be subject to valid settlement claims asserted in the manner required by law.

4. *Simultaneous filings for public land.*—Applications reaching said local land office within the said period of five days will be held and treated as simultaneously filed, and the register and receiver will dispose of them as follows:

(*a*) Where there is no conflict the application will be allowed, irrespective of whether settlement is alleged.

(*b*) In case of conflicting applications and only one of the applicants alleges prior settlement, his application will be allowed and the others rejected.

(*c*) If two or more conflicting applications, each containing allegations of prior settlement, are received, a hearing, restricted to those alleging such right, will be ordered to determine the priority of right.

(*d*) Where there are conflicting applications in which no one of the several applicants claims prior settlement the register and receiver will write on cards the names of the several applicants, and each of these cards will be placed in an envelope upon which there is no distinctive or identifying mark, and at 2 o'clcock p. m. on the date of opening to entry, if practicable (if not, at the same hour one day later), after all the envelopes containing the names of the several applicants shall have been thoroughly mixed in the presence of such persons as may desire to be present, they will be drawn and numbered in order. The cards as drawn and numbered will be securely fastened to the applications of the respective persons, and the appli-

cations will be allowed in such order. Applications conflicting in whole with those previously allowed will be rejected in the usual manner.

5. *Failure of applicant to obtain public land applied for.*—Where any applicant fails to obtain land applied for by him he will be permitted to elect whether he will amend his application to embrace other lands not affected by pending applications and otherwise subject thereto when such amended application is presented, or withdraw his original application without prejudice. In the event of such withdrawal the fees and commissions will be returned by the receiver, and the water-right charges deposited will be returned by the project manager upon surrender of the certificate of filing.

6. *Warning against unlawful settlement upon public land.*—No person will be permitted to gain or exercise any right whatever under any settlement or occupation of any of said public lands begun at or prior to 9 a. m., March 15, 1917: *Provided, however,* That this shall not affect any valid existing right obtained by settlement or entry while the land was subject thereto.

7. *Limit of area for which water right may be secured.*—The limit of area per entry representing the acreage which, in the opinion of the Secretary of the Interior, may be reasonably required for the support of a family upon such lands, is fixed as shown upon the plat for the several farm units. The maximum limit of area for which water-right application may be made for lands in private ownership shall be 160 acres of irrigable land for each land owner.

8. *Application for water right.*—All water-right applications, whether for public or private lands, must be made to the project manager, United States Reclamation Service, Hermiston, Oreg., upon forms provided for that purpose. Every application for public lands must be accompanied by the proper initial water-right payment, which will be accepted by the project manager in the form of New York draft or money order payable to special fiscal agent, United States Reclamation Service, Hermiston, Oreg., or in currency. Each water-right application for public lands must be for a specific farm unit, and more than one person may make such application for the same farm unit. A certificate of filing will be issued each applicant by the project manager. Filing of water-right application and issuance of certificate give no preference right to entry on public lands. Only when the project manager is notified by the local land office that an entry has been allowed will acceptance of the water-right application be indorsed thereon. Whereupon all other water-right applications affecting the farm unit in question, with payments made, will be returned to the respective applicants, upon surrender by them of the certificates of filing issued by the project manager. Water-right application for lands in private ownership may be made on and after date of this notice.

9. *Classes of charges for water rights.*—The water-right charges are of two kinds, to wit: (1) A charge against each irrigable acre to cover cost of construction of the irrigation system, termed the construction charge; and (2) an annual charge against each irrigable acre to cover cost of operation and maintenance of the system, termed the operation and maintenance charge.

10. *Construction charge.*—The construction charge shall be $70 per acre of irrigable land, payable as follows:

(*a*) For lands that were prior to August 13, 1914, subjected by contract or otherwise to the provisions of the reclamation law, said construction charge shall be paid in ten equal annual installments, the first of which shall be paid at the time of filing water-right application, and subsequent installments shall be due and payable December 1 of each year thereafter: *Provided, however,* That if water-right application subject to the provisions of said reclamation extension act, or an acceptance of the provisions of said act, be filed within six months from the date of this notice, said construction charge shall be payable in 20 installments, the first of which shall become due and payable on December 1 following the date of water-right application, and subsequent installments on December 1 of each year thereafter; in which event the first four installments shall each be 2 per cent, the next two installments each 4 per cent, and the next 14 each 6 per cent of the total construction charge.

(*b*) For the remaining lands an initial payment of 5 per cent of the construction charge shall be made at the time of filing water-right application, and the remainder of the construction charge shall be paid in 15 annual installments, the first five of which shall each be 5 per cent and the remainder each 7 per cent of the total construction charge. The first of said 15 annual installments shall become due and payable December 1 of the fifth calendar year after the initial installment, and subsequent installments shall become due and payable on December 1 of each calendar year thereafter.

11. *Increased construction charge in certain cases.*—In all cases where water-right application for lands in private ownership or for lands under entries not subject to the Reclamation Act shall not be made within one year from the date of this notice, the construction charge for such land shall be increased 5 per cent each year until such application is made and an initial installment is paid.

12. *Advance payment of construction charge permissible.*—Any water-right applicant may, at his option, pay in advance the whole or any part of the construction charge owing by him within any shorter period than that prescribed by this notice.

13. *Operation and maintenance charge.*—The operation and maintenance charge for the irrigation season of 1917 and thereafter, until further notice, shall be $1.40 per care of irrigable land whether water is used thereon or not, which will entitle the water user to 4 acre-feet of water per irrigable acre. Additional water supply will be furnished at the rate of 15 cents per acre-foot. All such charges will be payable on March 1 of each year for the preceding irrigation season, except that when original water-right application is filed for lands entered after June 15 in any year, the first payment of such charge becomes due March 1 of the second year thereafter.

14. *Place and manner of payment of water charges.*—All water-right charges must be paid at the office of the United States Reclamation Service at Hermiston, Oreg., in cash, or by New York draft, or money order, payable to the special fiscal agent, United States Reclamation Service.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

PUBLIC NOTICE, MARCH 23, 1917.

1. *Annual operation and maintenance charges.*—In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and of acts amendatory thereof and supplementary thereto, and particularly of the reclamation extension act of August 13, 1914 (38 Stat., 686), announcement is hereby made that the annual operation and maintenance charges for the irrigation season of 1917 and thereafter until further notice, against all lands of the Umatilla project, Oregon, under public notice, shall be as follows: For lands of the west extension a minimum charge of $1.50 per irrigable acre and for all other lands a minimum charge of $1.40 per irrigable acre, whether water is used thereon or not, which minimum charge in each case will entitle the water user to 4 acre-feet of water per irrigable acre. Additional supplies will be furnished for 15 cents per acre-foot.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

PUBLIC NOTICE, APRIL 20, 1917.

1. *Supplemental construction.*—Under the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and of acts amendatory thereof and supplementary thereto, particularly section 4 of the reclamation extension act of August 13, 1914 (38 Stat., 686), all of the water-right applicants and landowners in district No. 15 of the Umatilla project, Oregon, have made agreements providing for an increase in the cost of construction in the sum of $18 per irrigable acre, for the construction of a 20-inch pipe line about 450 feet long followed by 350 feet of concrete lined lateral, then a 20-inch pipe line about 580 feet long followed by 1,150 feet of concrete lined lateral and pipe culvert across the road, whereby water will be delivered to the commanding points of a controlling ridge from which the land on either side may be irrigated, which will involve a cost of not to exceed $18 per irrigable acre of land.

2. *Lands affected.*—The lands in the said district, all of which are subject to said increased charge, are described as follows:

T. 5 N., R. 29 E., W. M.—Section 32, SW. ¼ NW. ¼ W. ½ SE. ¼ NW. ¼; section 31, SE. ¼ NE. ¼; section 31, SE. ¼ SW. ¼ NE. ¼.

That portion of the N. ½ SE. ¼, section 31, described as follows: Beginning at the northeast corner of said SE. ¼, thence S. 63° 21′ W. 2,214 feet, thence north 330′, thence west 330′, thence north 660′, thence easterly along the north boundary of said SE. ¼ 2,310 feet to the point of beginning.

3. *Ratification.*—The said agreements are hereby ratified and confirmed and the said increase in the construction charge of $18 per irrigable acre is hereby made effective in accordance with the conditions of the said agreements as hereinafter specified.

4. *Payment of increased charge.*—Such increased charge of $18 per irrigable acre shall be added to the construction charge against the land in question and be paid in additional annual installments after the last of the installments now payable under the said reclamation extension act, being three annual installments of $6 each per irrigable acre.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

PUBLIC NOTICE, APRIL 23, 1917.

1. *Supplemental construction.*—Under the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof, and supplementary thereto, particularly section 4 of the reclamation extension act of August 13, 1914 (38 Stat., 686), a majority of the water-right applicants and owners of the lands included in district No. 13 of the Umatilla project, Oregon, all of which lands are subject to the provisions of said reclamation extension act, have made agreements providing for an increase in the cost of construction in the sum of $13 per irrigable acre. This increased cost is for the building of a concrete-lined distributary about 2,500 feet long, and a drop of about 320 feet of 16-inch pipe, whereby water may be delivered as near as practicable to the commanding points of the various units in said district, all of which supplemental construction will involve a cost of not to exceed $13 per irrigable acre of land.

2. *Lands affected.*—The lands in the district, all of which are subject to said increased charge, are described as follows:

T. 5 N., R. 29 E., W. M.—Section 29, S. ½ NW. ¼ N. ½. N. ½ SW. ¼; section 30, SE. ¼ NE. ¼ NE. ¼ SE. ¼.

3. *Ratification.*—The said agreements are hereby ratified and confirmed and the said increase in the construction charge of $13 per irrigable acre is hereby made effective in accordance with the conditions of the said agreements as hereinafter specified.

4. *Payment of increased charge.*—Such increased charge of $13 per irrigable acre shall be added to the construction charge against the land in question and be paid in additional annual installments after the last of the installments now payable under the reclamation extension act, being one annual installment of $6 per irrigable acre and one final installment of $7 per irrigable acre.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix, p. 512.]

Feature costs of Umatilla project to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys	$84.56	$115,210.50
Storage system:		
Cold Springs Dam	[1] 140.00	439,734.00
Feed canal	40,300.59	359,228.19
Lands, rights of way, etc	1,074.22	40,479.12
	41,234.81	839,441.31
Canal system:		
Canal system, east side enlargement, Maxwell canal	10,646.91	92,546.82
Main canal, west extension	4,111.46	554,104.35
Siphon Coyote cut-off, west extension		768.12
Wasteway, main canal, west extension	35.76	2,016.10
Wasteway culvert, west extension	440.68	1,440.76
Administrative general expense	917.71	4,795.52
	16,152.52	655,671.67

Feature cost of Umatilla project to June 30, 1917—Continued.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Lateral system:		
East side	$2,012.67	$433,009.19
East side supplemental construction	17,344.70	31,463.65
West extension	94,067.42	148,885.94
Administrative general expense	947.79	8,284.69
	114,372.58	621,643.47
Drainage system:		
Hermiston drain		43,015.23
Second unit drain		3,174.60
Hat Rock drain		1,604.65
Umatilla drain		6,022.69
Miscellaneous	[1] 742.95	3,328.36
	[1] 742.95	57,145 53
Farm units	414.91	2,817.47
Permanent improvements:		
Buildings	53.60	24,611.74
Miscellaneous		716.26
	53.60	25,328.00
Telephone system	30.40	2,670.87
Plant accounts	[1] 2,043.08	5,772.99
Operation and maintenance charges transferred to and compounded with construction charges	77.02	19,524.80
Unadjusted clearing accounts	2,714.71	2,714.71
Gross construction cost to June 30, 1917	172,349.08	2,347,941.32
Less revenues earned during construction period:		
Rental of buildings	442.00	5,041.25
Rental of grazing and farming lands	120.50	22,011.96
Rentals of irrigation water	[1] 15.54	80.00
Contractors' freight refunds		1,055.31
Forfeitures by defaulting bidders and contractors		100.00
Other revenues, unclassified		10,060.00
Profit on mess-house operations	[1] 572.29	2,115.49
Profit on mercantile store operations		7.75
Profit on hospital operations	856.06	[1] 205.13
	830.73	40,266.63
Net cost of construction of project to June 30, 1917		2,307,674.69

[1] Deduct.

Statement of cost by calendar years, Umatilla project.

Year ending Dec. 31—	Construction.	Operation and maintenance under public notice.	Total cost.
1907	$628,021.43		$628,021.43
1908	342,724.04	$21,533.97	364,258.01
1909	110,049.68	27,209.09	137,258.77
1910	81,557.21	30,724.15	112,281.36
1911	134,764.17	30,538.32	165,302.49
1912	93,190.64	27,140.45	120,331.09
1913	71,021.46	32,737.93	103,759.39
1914	314,071.70	26,334.68	340,406.38
1915	299,695.13	24,704.45	324,400.58
1916	187,294.25	28,601.92	215,896.17
January to June 30, 1917	57,538.11	20,200.61	77,738.72
Plant and clearing accounts and operation and maintenance added to construction	28,012.50		28,012.50
Total	2,347,941.32	269,725.57	2,617,666.89

Statement of cost by fiscal years, Umatilla project.

Year ending June 30—	Construction.	Operation and maintenance under public notice.	Total cost.
1908	$882,041.86	$8,593.98	$890,635.84
1909	128,965.20	26,484.38	155,449.58
1910	116,039.24	26,546.55	142,585.79
1911	105,634.29	33,554.23	139,188.52
1912	113,636.13	28,444.26	142,080.39
1913	88,061.26	29,822.46	117,883.72
1914	102,389.31	30,981.80	133,371.11
1915	363,622.67	25,817.38	389,440.05
1916	247,938.43	23,842.94	271,781.37
1917	172,349.08	35,637.59	207,986.67
Plant and clearing accounts and operation and maintenance added to construction	27,263.85		27,263.85
Total	2,347,941.32	269,725.57	2,617,666.89

Estimated cost of contemplated work, Umatilla project, during fiscal year 1918.

Features.	Estimated cost during fiscal year 1918.	
	Subfeature.	Principal feature.
Examination and surveys		$500.00
Storage works: Irrigon reservoir, preliminary work		11,400.00
Lateral system:		
West extension	$50,000.00	
Supplemental construction, east side	20,000.00	
		70,000.00
Farm units		500.00
Permanent improvements, buildings		2,000.00
Operation and maintenance under public notice:		
East side	20,000.00	
West side	12,000.00	
		32,000.00
Total		116,400.00

OREGON-CALIFORNIA, KLAMATH PROJECT.

J. B. Bond, project manager, Klamath Falls, Oreg.

LOCATION.

Counties: Klamath, Oreg.; Siskiyou and Modoc, Cal.

Townships: 38 to 41 S., Rs. 8 to 14 E., Willamette meridian; 46 to 48 N., Rs. 1 to 8 E., Mount Diablo meridian.

Railroad: California Northeastern.

Railroad stations and estimated population, January 1, 1917: Klamath Falls, 5,000; Midland, 100; and Ady, Oreg.

WATER SUPPLY.

Source of water supply: Upper Klamath Lake, Lost River, and Clear Lake.

Area of drainage basin: 3,700 square miles.

Annual run-off in acre-feet, 1904 to 1916: Link River at Klamath Falls (3,110 square miles)—Maximum, 2,144,200; minimum, 1,215,700; mean, 1,655,100. Lost River and Willow Creek at Clear Lake—Maximum, 252,000; minimum, 34,700; mean, 128,000. Lost River at Olene and Merrill—Maximum, 473,500; minimum, 15,000; mean, 258,000.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service is prepared to supply water, season of 1917, 44,000 acres.

Area under water-right applications, season of 1917, 34,715 acres.

Length of irrigation season: From May 1 to September 30—153 days.

Average elevation of irrigable area: 4,100 feet above sea level.

Average annual rainfall on irrigable area, 9 years: 14.2 inches.

Range of temperature on irrigable lands: − 10° to 100° F.

Character of soil of irrigable area: Disintegrated basalt, volcanic ash, and diatomaceous earth, being largely classified as Yakima sandy loam.

Principal products: Alfalfa, hay, grain, and vegetables; stock, poultry, and dairy products.

Principal markets: Portland, Oreg.; Sacramento and San Francisco, Cal.

LANDS OPENED FOR IRRIGATION.

Dates of public notices and orders: November 18 and December 7, 1908; August 24, 1909; June 9, 1910; March 23 and September 24, 1914; March 26 and September 15, 1915; March 9 and 16, 1916; February 12, March 9 and 31, 1917.

Location of lands opened: T. 38 S., R. 9 E.; 39 S., Rs. 8 to 11½ E.; 40 S., Rs. 9 to 11 E.; 41 S., Rs. 10 to 12 E., Willamette meridian, and 48 N., R. 5 E., Mount Diablo meridian.

Present status of irrigable lands opened: 2,547 acres entered subject to the reclamation act; 338 acres open to entry; 112,611 acres in private ownership.

Limit of area of farm units: 160 acres.

Duty of water, 1.8 acre-feet per acre per annum at the farm.

Building charge per acre of irrigable land, $30 for the first and second units, $39 and $45 for the third unit.

Annual operation and maintenance charge, season of 1917, minimum charge, 85 cents per acre for 2 acre-feet; 20 cents for first additional acre-foot, and 40 cents per acre-foot thereafter.

CHRONOLOGICAL SUMMARY.

Reconnoissance made in October and November, 1903.

Preliminary surveys begun in 1904.

Construction recommended by a board of engineers May 1, 1905.

Construction authorized by Secretary May 15, 1905.

Main canal completed August, 1907.

First irrigation by Reclamation Service season of 1907.

Keno Canal completed October, 1908.
South Branch Canal completed March, 1909.
Clear Lake Dam completed January, 1910.
Lost River Diversion Dam completed June, 1912.
Adams Canal enlargement begun October, 1913, completed April, 1914.
Second unit lateral system begun October, 1912, completed June, 1915.
G Canal (enlargement of Griffith Lateral), begun March 8, 1915, completed April 30, 1915.
Lateral, margin of Tule Lake, begun June 5, 1916; completed June 30, 1917.
Entire project 58 per cent completed June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the Klamath project provides for storage of water in the natural reservoir of Upper Klamath Lake, lying just north of Klamath Falls, Oreg, and in the Clear Lake Reservoir, Cal., at the head of Lost River and 6 miles east of Tule Lake. Water for irrigation is diverted from the east side of Link River, the outlet of Upper Klamath Lake, 700 feet from the lake, into the Main (A) Canal, which extends 9 miles in a southeasterly direction, supplying canals and laterals in the first unit of the project, and a portion of the second unit in Poe Valley and on Nuss Lateral. The water diverted from Lost River into the Griffith (G) Canal at the Lost River Dam, 10 miles southeast from Klamath Falls, Oreg., supplies the lands under that canal in the second unit and also the Adams Canal, which covers the portion of the first unit east of Lost River, the lands on the margin of Tule Lake in private ownership, and a portion of the bed of Tule Lake in public ownership.

Clear Lake Dam and dikes were built mainly to withhold the waters of Lost River from Tule Lake, into which that river empties. The water stored in the Clear Lake Reservoir will be released into Lost River whenever needed for irrigation. Tule Lake has no visible outlet, and it is proposed to reclaim about 30,000 acres of the lake bed by evaporation. To assist in this, the Lost River Diversion Dam and channel (8 miles long) were built to divert the flood waters of Lost River into Klamath River.

The present irrigation system consists of 234 miles of canals and laterals, 67.7 miles of open drains, and 5.7 miles of closed drains. These works cover 29,700 acres of irrigable land in the first unit, 6,560 acres of irrigable land in the second unit, 5,960 acres of irrigable land in the third unit, and about 1,780 acres of Tule Lake bed, in public ownership, a total irrigable area of 44,000 acres.

As the reclamation of the bed of Tule Lake progresses, a second diversion dam will be built in Lost River about 15 miles nearly south from the first dam. This will divert water east and west on the reclaimed area of the lake bed.

A canal known as the Keno Power Canal was built on the west bank of Link River, in Klamath Falls, Oreg., diverting water from the river 1,200 feet from its outlet from Upper Klamath Lake. This canal, primarily designed for power purposes, was also planned to furnish water for irrigating lands on the west side of Klamath River, southwest from Klamath Falls, Oreg. No power plant, however, has been installed by the Government, as all irrigation at present is by gravity flow.

An undeveloped power site is located at the drop from the Main (A) Canal into the South Branch (C) Canal, 9 miles southeast from Klamath Falls, Oreg.

The principal features of the project are the Clear Lake Reservoir, the Lost River diversion works, the Keno Power Canal, the Main Canal Tunnel, 3,300 feet long, and the main canals of the distributing system.

SUMMARY OF GENERAL DATA FOR KLAMATH PROJECT TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is complete		142,796
Public land entered to end of fiscal year	2,547	
Public land open to entry at end of fiscal year	338	
Public land withdrawn at end of fiscal year	27,300	
Private land	112,611	
Acreage service could have supplied season of 1916		40,000
Addition in fiscal year, 1917		4,000
Estimated addition in fiscal year, 1918		1,000
Estimated acreage service can supply July 1, 1918		45,000
Acreage actually irrigated, season of 1916		29,351
Acreage cropped under irrigation, season of 1916		29,351

Crops:		
Value of irrigated crops, season of 1916		$509,865.00
Value of irrigated crops, per acre cropped		$17.37
Finance:		
Gross construction cost to end of fiscal year		$2,860,962.72
Per cent complete at end of fiscal year		58
Appropriated for fiscal year 1918, total		$239,000.00
Allotment for construction, fiscal year 1918		$144,000.00
Estimated per cent complete, June 30, 1918		60
Proposed appropriation, fiscal year 1919, for construction		$300,000.00
Estimated gross construction expenditures to June 30, 1919		$3,304,962.72
Estimated per cent complete, June 30, 1919		65
Announced construction charges per acre		$30, $39, $45
Appropriation, fiscal year 1917		[1] $358,333.01
Expenditures during fiscal year, chargeable to 1917 appropriation—		
Disbursements	$111,694.62	
Transfers	10,323.67	
	$122,018.29	
Registered liabilities chargeable to 1917 appropriation	18,758.03	
		140,776.32
Unencumbered balance, July 1, 1917		217,556.69
Repayments:		
Construction charges—		
Accrued to end of fiscal year		303,006.23
Collected to end of fiscal year		300,623.17
Uncollected at end of fiscal year		2,383.06
Operation and maintenance charges (public notice)—		
Accrued to end of fiscal year		177,138.79
Collected to end of fiscal year		172,396.82
Uncollected at end of fiscal year		4,741.97
Water-rental charges—		
Accrued to end of fiscal year		35,648.21
Collected to end of fiscal year		35,648.21
Power earnings—		
Accrued to end of fiscal year		1,020.00
Collected to end of fiscal year		1,020.00
Drainage:		
Estimated acreage damaged by seepage to end of fiscal year		6,200
Miles of drains built to end of fiscal year—		
Open	67.7	
Closed	5.7	
		73.4
Estimated acreage protected by drains built to end of fiscal year		17,000
Estimated acreage to be protected by authorized system		29,600
Cost of drainage works to end of fiscal year		$268,187.74

CONSTRUCTION DURING FISCAL YEAR.

Construction of the laterals, turnouts, checks, and bridges for the lands included in the third unit, begun during the latter part of the fiscal year 1916, was completed during the spring of 1917.

[1] Includes balance of 1916 appropriation and refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

SEEPAGE AND DRAINAGE.

Drainage work under the first unit was continued. Two drag-line machines and one Austin trenching machine were in use. The drag-line machines were used on main drains under the Adams and South Branch canals. The trenching machine operated along the Main and South Branch canals on deep toe drains. At the end of the fiscal year 67.7 miles of open drains and 5.7 miles of closed drains had been constructed. These drains furnish protection for an area estimated at 17,000 acres.

BOARD MEETINGS.

Date.	Subject.	Personnel.
Oct. 9, 1916	Lease of Keno Power Canal	James T. Chinnock, F. E. Weymouth, D. C. Henny, R. E. Bradbury and J. G. Camp.
Oct. 13, 1916	Division cost	D. C. Henny and J. G. Camp.
Feb. 27, 1917	Klamath project	D. C. Henny, D. W. Cole, E. S. Taylor, and J. G. Camp.

OPERATION AND MAINTENANCE.

The first unit has been operated under public notice since November, 1908. The second and third units were opened under public notice during the spring of 1917, and a portion of the lands furnished water under water rental agreements.

No stored water was used from Clear Lake Reservoir during 1916, as the run-off from Link and Lost Rivers was more than enough to supply all demands.

The operating season of 1916 opened on April 18 and closed September 30. The months of April and May were unusually dry, which made the early requirements for water heavy.

The spring of 1917 was unusually cold and damp. The operating season did not begin until May 1. After May 15, 1917, warm weather accompanied by high winds caused a heavy demand for water.

The maintenance work consisted of cleaning canals of silt and weeds, repairing breaks, and replacing and repairing timber structures. No serious breaks occurred during the year.

Historical review, Klamath project.

Item.	1912	1913	1914	1915	1916	1917
Acreage for which service was prepared to supply water	30,093	29,700	35,400	36,000	40,000	44,000
Acreage irrigated	23,834	18,928	24,440	27,254	29,351	.....
Number of farms irrigated	405	325	333	315	350	.....
Miles of canals operated	132	132	178	187	216	.....
Water diverted (acre-feet)	42,100	38,000	56,750	68,830	66,010	.....
Water delivered to land (acre-feet)	23,619	22,160	25,610	30,640	29,970	.....
Per acre of land irrigated (acre-feet)	1.13	1.17	1.05	1.125	1.02	.....

SETTLEMENT.

On April 25, 1917, 42 farm units under the third unit of the project were opened for settlement under public notice dated March 31, 1917. All but four of the units were entered. The entrymen, in the majority of cases, immediately moved upon the land and began to prepare it for cultivation.

Settlement data, Klamath project.

Item.	1912	1913	1914	1915	1916	1917
Total number of farms on project	430	350	373	391	409	527
Population	1,100	1,125	1,375	1,520	1,580	[1] 1,610
Number of irrigated farms	405	325	333	352	409	527
Operated by owners or managers	365	259	250	247	287	[1] 380
Operated by tenants	40	66	83	105	122	[1] 147
Population	1,028	1,050	1,300	1,425	1,485	[1] 1,610
Number of towns	4	4	4	4	4	4
Population	5,290	5,300	4,500	4,700	5,000	[1] 5,700
Total population in towns and on farms	6,390	6,425	5,875	6,220	6,580	[1] 7,310
Number of public schools	16	16	18	19	20	20
Number of churches	9	9	9	9	9	9
Number of banks	4	3	3	3	3	3
Total capital stock	$275,000	$175,000	$175,000	$175,000	$175,000	$175,000
Total amount of deposits	.....	.....	$1,000,000	$1,118,500	$1,219,846	$1,390,000
Total number of depositors	.....	.....	2,600	3,565	4,281	5,310

[1] Estimated.

PRINCIPAL CROPS.

During 1916 the area irrigated and cropped amounted to 29,351 acres. The value of crops was $509,865, as compared with $372,804 in 1915. In the spring of 1917 about 100 acres were planted to sugar beets which are to be shipped to the factory at Grants Pass, Oreg. If the yield and tests are satisfactory, it seems probable that a sugar-beet factory will be located on the project.

The agricultural situation for 1917 is promising for irrigated crops. The spring was very late and seeding was retarded. Hot weather during the latter part of May and throughout June has been favorable to plant growth when the crops received sufficient moisture. The dry-land crops are suffering from the dry, hot weather.

Crop report, Klamath project, Oregon-California, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa	8,140	Ton	17,720	2.2	$12.00	$222,640	$26.40
Barley	6,968	Bushel	168,680	24.2	.90	151,812	21.80
Fruit	6	Acre	.....	.....	.....	6	1.00
Garden	100	.....	.....	.....	.....	4,680	46.80
Hay	2,762	Ton	3,353	1.22	10.00	33,530	12.20
Oats	2,331	Bushel	62,347	26.7	.60	37,408	16.00
Pasture	5,991	.....	.....	.....	.....	17,973	3.00
Potatoes	230	Bushel	2,604	11.3	1.35	3,515	15.30
Rye	668	do	10,765	18.6	1.20	12,918	22.30
Wheat	2,155	do	18,802	8.7	1.35	25,383	11.70
Total irrigated and cropped acreage.	29,351	Total and average				509,865	17.37

		Areas.	Acres.	Farms.	Per cent of project.
		Total irrigable area farms reported	37,513	.....	.....
		Total irrigated area farms reported	29,351	350	100
		Under water-right applications	23,333	291	83
		Under rental contracts	6,018	59	17
Total irrigated	29,351	Total cropped area farms reported	29,351	350	100

PUBLIC NOTICES AND ORDERS.

PUBLIC NOTICE, FEBRUARY 12, 1917.

1. In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and of acts amendatory thereof and supplementary thereto, and particularly of the reclamation extension act of August 13, 1914 (38 Stat., 686), public notice for lands in the second unit of Klamath project, Oregon-California, is hereby issued, as follows:

2. *Lands for which water will be furnished.*—Upon proper application being made therefor, water will be furnished under said project in the irrigation season of 1917, and thereafter, for the irrigable lands in said second unit, shown on farm-unit plats of the following townships of the Willamette meridian, to wit, T. 39 S., R. 10 E.; T. 39 S., R. 11½ E.; T. 40 S., R. 10 E.; T. 40 S., R. 11 E.; T. 41 S., R. 11 E., which plats were approved December 11, 1916, by First Assistant Secretary of the Interior and are on file in the office of the project manager, United States Reclamation Service, Klamath Falls, Oreg., and in the local land office at Lakeview, Oreg.

3. *Limit of area for which water right may be secured.*—The maximum limit of area for which water-right application may be made for lands in private ownership shall be 160 acres of irrigable land for each landowner.

4. *Application for water rights.*—All water-right applications must be made to the project manager, United States Reclamation Service, Klamath Falls, Oreg., upon forms provided for that purpose, and may be made on and after the date of this notice.

5. *Classes of charges for water rights.*—The water-right charges are of two classes, to wit, (1) a charge against each irrigable acre to cover the cost of construction of the irrigation system, called the construction charge; and (2) an annual charge against each irrigable acre to cover the cost of operation and maintenance of the system, called the operation and maintenance charge.

6. *Construction charge.*—The construction charge for said lands shall be $30 per irrigable acre, payable as follows:

(*a*) For lands that were, prior to August 13, 1914, subjected by contract or otherwise to the provisions of the reclamation law, said construction charge shall be paid in 10 equal annual instalments, the first of which shall be paid at the time of filing water-right application, and subsequent instalments shall be due and payable on December 1 of each year thereafter; provided, that if water-right application subject to the provisions of said reclamation extension act, or an acceptance of the provisions of said extension act in accordance with section 14 thereof, be filed within six months from the date hereof, said construction charge shall be payable in 20 annual instalments, the first of which shall become due and payable on December 1 following the date of water-right application, and subsequent instalments on December 1 of each year thereafter, in which event the first four instalments shall each be 2 per cent, the next two instalments shall each be 4 per cent, and the next 14 each 6 per cent of the total construction charge.

(*b*) For the remaining lands, an initial payment of 5 per cent of the construction charge shall be made at the time of filing water-

right application, and the remainder of the construction charge shall be paid in 15 annual instalments, the first 5 of which shall each be 5 per cent and the remainder each 7 per cent of the total construction charge. The first of said 15 instalments shall become due and payable December 1 of the fifth calendar year after the initial instalment, and subsequent instalments shall become due and payable on December 1 of each calendar year thereafter.

7. *Increased construction charge in certain cases.*—In all cases where water-right application for lands in private ownership, as shown on said farm-unit plats, shall not be made within one year after the date of this notice, the construction charge for such land shall be increased 5 per cent each year until such application is made and the initial instalment paid.

8. *Advance payment of construction charge permissible.*—Any water-right applicant may, at his option, pay in advance the whole or any part of the construction charge owing by him within any shorter period than that prescribed by this notice.

9. *Operation and maintenance charge.*—The operation and maintenance charge for the irrigation season of 1917, and thereafter until further notice, shall be 85 cents per acre of irrigable land whether water is used thereon or not, which will entitle the water user to 2 acre-feet of water per irrigable acre. Additional water supply will be furnished at the rate of 20 cents per acre-foot for the first additional acre-foot per acre and 40 cents per acre-foot for all above the first additional acre-foot. All operation and maintenance charges will be payable on March 1 of each year for the preceding irrigation season.

10. *Place and manner of payment.*—All water-right charges must be paid at the office of the United States Reclamation Service, Klamath Falls, Oreg., in currency or by New York draft or money order payable to special fiscal agent, United States Reclamation Service.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

PUBLIC NOTICE, MARCH 9, 1917.

1. *Annual operation and maintenance charges.*—In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and of acts amendatory thereof and supplementary thereto, and particularly of the reclamation extension act of August 13, 1914 (38 Stat., 686), announcement is hereby made that the annual operation and maintenance charge for the irrigation season of 1917, and thereafter until further notice, against all lands of the Klamath project, Oregon-California, under public notice, shall be a minimum charge of 85 cents per irrigable acre whether water is used thereon or not, which will entitle the water user to 2 acre-feet of water per irrigable acre; and that additional water will be furnished up to a limit of 3 acre-feet per irrigable acre at the rate of 20 cents per acre-foot, and all further quantities for 40 cents per acre-foot. All operation and maintenance charges are payable on March 1 for the preceding irrigation season.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

PUBLIC NOTICE, MARCH 31, 1917.

1. In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and of acts amendatory thereof and supplementary thereto, and particularly of the reclamation extension act of August 13, 1914 (38 Stat., 686), public notice for lands in the third unit of Klamath project, Oregon-California, is hereby issued as follows:

2. *Lands for which water will be furnished.*—Upon proper application being made therefor, water will be furnished under said project in the irrigation season of 1917 and thereafter, for the irrigable lands in said third unit, shown on farm-unit plats of the following townships of the Willamette and Mount Diablo meridians, to wit: T. 41 S., R. 11 E., W. M., Oregon; T. 41 S., R. 12 E., W. M., Oregon; T. 48 N., R. 5 E. M. D. M., California; which plats were approved March 31, 1917, by the Secretary of the Interior and are on file in the office of the project manager, United States Reclamation Service, Klamath Falls, Oreg., and in the local land offices at Lakeview, Oreg., and at Sacramento, Cal.

3. *When and how to make entry for public land.*—Homestead entries for the farm units shown on said plats embracing public lands of the United States may be made beginning April 25, 1917, at 9 o'clock a. m. at the local land office of the district within which said land is situated. Every person desiring to acquire any of said public lands must execute a homestead application subject to the provisions of the reclamation law in manner required by law, which, with the required fees and commissions, accompanied by certificate of the project manager as to the filing of water-right application and payment of water-right charges as hereinafter provided, may be presented to said local land office, in person, by mail or otherwise, within a period of nine days prior to the opening, to wit: On and from April 16, 1917, to and including 9 o'clock a. m., April 25, 1917. Applications presented after said period of nine days will be filed and noted in the order of their receipt. Any application not based on a prior settlement right will be subject to valid settlement claims asserted in the manner required by law.

4. *Simultaneous filings for public land.*—Applications reaching said local land office during said period of nine days will be held and treated as simultaneously filed, and the register and receiver will dispose of them as follows:

(a) Where there is no conflict the application will be allowed, irrespective of whether settlement is alleged.

(b) In case of conflicting applications and only one of the applicants alleges prior settlement, his application will be allowed and the others rejected.

(c) If two or more conflicting applications, each containing allegations of prior settlement are received, a hearing restricted to those alleging such right will be ordered to determine the priority of right.

(d) Where there are conflicting applications in which no one of the several applicants claims prior settlement the register and receiver will write on cards the names of the several applicants, and each of these cards will be placed in an envelope upon which there is no distinctive or identifying mark, and at 2 o'clock p. m., on the date of opening to entry, if practicable (if not, at the same hour one day later), after all the envelopes containing the names of the several

applicants shall have been thoroughly mixed in the presence of such persons as may desire to be present, they will be drawn and numbered in order. The cards as drawn and numbered will be securely fastened to the applications of the respective persons, and the applications will be allowed in such order. Applications conflicting in whole with those previously allowed will be rejected in the usual manner.

5. *Failure of applicant to obtain public land applied for.*—Where any applicant fails to obtain land applied for by him he will be permitted to elect whether he will amend his application to embrace other lands not affected by pending applications and otherwise subject thereto when such amended application is presented, or withdraw his original application without prejudice. In the event of such withdrawal the fees and commissions will be returned by the receiver, and the water-right charges deposited will be returned by the project manager upon surrender of the certificate of filing issued by the project manager.

6. *Warning against unlawful settlement upon public land.*—No person will be permitted to gain or exercise any right whatever under any settlement or occupation of any of said public lands, begun at or prior to 9 a. m., April 25, 1917, provided, however, that this will not affect any valid existing right obtained by settlement or entry while the land was subject thereto.

7. *Limit of area for which water right may be secured.*—The limit of area per entry representing the acreage which, in the opinion of the Secretary of the Interior, may be reasonably required for the support of a family upon such lands is fixed as shown upon the plats for the several farm units. The maximum limit of area for which water-right application may be made for lands in private ownership shall be 160 acres of irrigable land for each landowner.

8. *Application for water rights.*—All water-right applications, whether for public or private lands, must be made to the project manager, United States Reclamation Service, Klamath Falls, Oreg., upon forms provided for that purpose. Every application for public lands must be accompanied by the proper initial water-right payment. Each such application must be for a specific farm unit, and more than one person may make application for the same farm unit. A certificate of filing will be issued each applicant by the project manager. Filing of water-right application and issuance of certificate give no preference right to entry on public lands. Only when the project manager is notified by the local land office that an entry has been allowed will acceptance of the water-right application be indorsed thereon. Whereupon all other water-right applications affecting the farm unit in question, with payment made, will be returned to the respective applicants upon surrender by them of the certificates of filing issued by the project manager. Water-right application for private lands may be made on and after date of this notice.

9. *Classes of charges for water rights.*—The water-right charges are of two classes, to wit: (1) A charge against each irrigable acre to cover the cost of construction of the irrigation system, called the construction charge, and (2) an annual charge against each irrigable acre to cover the cost of operation and maintenance of the system, called the operation and maintenance charge.

10. *Construction charge.*—The construction charge for said lands shall be $45 per irrigable acre for unentered public land and $39 per irrigable acre for all other land, payable as follows:

(*a*) For lands that were prior to August 13, 1914, subjected by contract or otherwise to the provisions of the reclamation law, said construction charge shall be paid in not more than 10 equal annual installments, the first of which shall be paid at the time of filing water-right application, the second of which shall be paid December 1 of the following year, and subsequent installments shall be paid December 1 of each year thereafter: *Provided, however,* That if water-right application subject to the provisions of the reclamation extension act of August 13, 1914, or an acceptance of the provisions of said extension act in accordance with section 14 thereof be filed within six months from the date of this notice, said construction charge shall be payable in 20 annual installments, the first of which shall become due and payable on December 1 following the date of water-right application, and subsequent installments on December 1 of each year thereafter, in which event the first 4 installments shall each be 2 per cent, the next 2 installments shall each be 4 per cent, and the next 14 each 6 per cent of the total construction charge.

(*b*) For the remaining lands an initial payment of 5 per cent of the construction charge shall be made at the time of filing water-right application, and the remainder of the construction charge shall be paid in 15 annual installments, the first 5 of which shall each be 5 per cent and the remainder each 7 per cent of the total construction charge. The first of said 15 annual installments shall become due and payable December 1 of the fifth calendar year after the initial installment, and subsequent installments shall become due and payable on December 1 of each calendar year thereafter.

11. *Increased construction charge in certain cases.*—In all cases where water-right application for lands in private ownership, or for lands under entries not subject to the reclamation law, shall not be made within one year from the date of this notice, the construction charge for such land shall be increased 5 per cent each year until such application is made and the initial installment paid.

12. *Advance payment of construction charge permissible.*—Any water-right applicant may, at his option, pay in advance the whole or any part of the construction charge owing by him within any shorter period than that prescribed by this notice.

13. *Operation and maintenance charges.*—The operation and maintenance charges for the irrigation season of 1917, and thereafter until further notice, shall be a minimum charge of 85 cents per irrigable acre, whether water is used thereon or not, which will entitle the water user to 2 acre-feet of water per irrigable acre, and additional water will be furnished up to a total limit of 3 acre-feet per irrigable acre at the rate of 20 cents per acre-foot, and all further quantities for 40 cents per acre-foot. All operation and maintenance charges will be due and payable on March 1 of each year for the preceding irrigation season, except that when water-right application is made for public lands entered on or after June 15 in any year the first payment for such charge becomes due March 1 of the second year thereafter.

14. *Place and manner of payment.*—All water-right charges must be paid at the office of the United States Reclamation Service, Kla-

math Falls, Oreg., in currency or by New York draft or money order payable to special fiscal agent, United States Reclamation Service.

FRANKLIN K. LANE,
Secretary of the Interior.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix, p. 515.]

Feature costs of Klamath project, to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys:		
Project as a whole	.....	$47,356.44
Modoc unit	.....	5,624.34
Experimental farm	.....	16,236.55
Tule Lake outlets	$314.55	20,936.87
Horsefly Irrigation District	.....	161.10
Stream gauging	2,141.62	27,932.89
Sand Hollow	40.58	716.98
Sand Hollow cooperative	[1] 272.89	830.29
Upper Klamath Lake	314.50	4,765.49
Tule Lake, north shore	1,653.54	1,653.54
Pine Grove	[1] 87.43	87.42
Ground-water surveys	88.56	88.56
J Canal headworks	35.32	35.32
South Branch cut-off	63.09	63.09
Administrative general expense	[1] 638.62	.....
	3,652.82	126,488.88
Storage system:		
Clear Lake Dam and dikes	.....	332,354.88
Horsefly Reservoir site	.....	670.49
	.....	333,025.37
Canal system:		
Main Canal	.....	696,968.88
East Branch Canal	.....	49,639.53
South Branch Canal	.....	193,495.09
Adams and Carr Canals	.....	182,257.33
Lost River diversion channel	[1] 1,191.00	308,208.47
Griffith Canal (enlargement)	.....	82,440.25
Ankeny Canal	.....	57,090.00
Langell Valley Canals	.....	9,834.23
Second unit minor structures	30.79	30.79
Supplemental construction	18.91	1,791.19
	[1] 1,141.30	1,581,755.76
Lateral system:		
First unit	.....	150,820.54
Second unit	434.98	114,111.71
Third unit	15,359.92	33,225.90
Supplemental construction	1,895.43	14,975.03
	17,690.33	313,133.18
Drainage system:		
First unit	.....	112,282.89
Second unit	167.13	437.74
Langell Valley	.....	428.16
Lower Lake	.....	9,147.28
Pumping unit	.....	2,650.02
Supplemental construction	85,635.55	143,241.65
	85,802.68	268,187.74

[1] Deduct.

Feature costs of Klamath project, to June 30, 1917—Continued.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1916.
Power system:		
Keno Canal		$111,329.02
South Branch power plant		740.10
McCormick tract		11,424.62
Leavitt tract		3,415.38
		126,909.12
Farm units:		
Second unit	$25.03	2,609.15
Third unit	1,150.19	1,640.19
	1,175.22	4,249.34
Permanent improvements: Headquarters	1,277.62	20,043.72
Telephone system		26,185.87
Operation and maintenance during construction	5,513.83	30,347.18
Operation and maintenance charges compounded with construction		1,269.95
Plant	[1] 3,402.45	29,215.18
Unadjusted clearing accounts	151.43	151.43
Gross construction cost to June 30, 1917	110,720.18	2,860,962.72
Less revenues earned during construction period:		
Rental of buildings	199.50	229.50
Rentals of grazing and farming lands	2,216.79	9,029.02
Rentals of irrigation water	333.24	31,821.45
Contractors' freight refunds		8,555.71
Other revenues, unclassified	43.29	902.05
Profit on mess house operations	[1] 1,710.85	[1] 1,710.85
Profit on mercantile store operations	892.26	892.26
Profit on hospital operations	532.05	532.05
	2,506.28	50,251.19
Net cost of construction of project to June 30, 1917		2,810,711.53

[1] Deduct.

Statement of cost, by calendar years, Klamath project.

Year ending Dec. 31—	Construction.	Operation and maintenance.			Total cost.
		During construction.	Under public notice.	Total operation and maintenance.	
1904	$11,498.31				$11,498.31
1905	65,987.53				65,987.53
1906	531,011.27				531,011.27
1907	675,762.74		$12,430.27	$12,430.27	688,193.01
1908	274,708.96		20,089.92	20,089.92	294,798.88
1909	246,820.94		21,735.08	21,735.08	268,556.02
1910	96,939.10		20,000.49	20,000.49	116,939.59
1911	261,951.81		20,981.02	20,981.02	282,932.83
1912	85,753.17		21,318.18	21,318.18	107,071.35
1913	143,750.77		30,479.31	30,479.31	174,230.08
1914	77,941.36	$9,611.63	31,898.26	41,509.89	119,451.25
1915	142,285.42	12,251.77	36,790.54	49,042.31	191,327.73
1916	139,951.49	7,338.52	13,635.90	20,974.42	160,925.91
January to June 30, 1917	46,886.06	1,145.26	19,023.30	20,168.56	67,054.62
Plant and clearing accounts to June 30, 1917	29,366.61				29,366.61
Total	2,830,615.54	30,347.18	248,382.27	278,729.45	3,109,344.99

Statement of cost, by fiscal years, Klamath project.

Year ending June 30—	Construction.	Operation and maintenance.			Total cost.
		During construction.	Under public notice.	Total operation and maintenance.	
1905	$34,559.30				$34,559.30
1906	172,254.23				172,254.23
1907	827,030.70		$2,872.06	$2,872.06	829,902.76
1908	302,201.46		15,894.95	15,894.95	318,096.41
1909	319,322.32		23,560.28	23,560.28	342,882.60
1910	195,619.44		21,534.13	21,534.13	217,153.57
1911	119,572.90		22,666.33	22,666.33	142,239.23
1912	221,140.67		15,302.46	15,302.46	236,443.13
1913	132,518.87		25,694.92	25,694.92	158,213.79
1914	105,421.14	$3,777.64	30,011.33	33,788.97	139,210.11
1915	156,238.10	8,525.95	41,991.04	50,516.99	206,755.09
1916	106,912.43	12,529.76	19,274.85	31,804.61	138,717.04
1917	105,206.35	5,513.83	29,579.92	35,093.75	140,300.10
Plant and clearing accounts to June 30, 1916	32,617.63				32,617.63
Total	2,830,615.54	30,347.18	248,382.27	278,729.45	3,109,344.99

Estimated cost of contemplated work, Klamath project, during fiscal year 1918.

Features.	Estimated cost during fiscal year 1918.	
	Sub-feature.	Principal feature.
Examination and surveys:		
Trial lines	$179.00	
Hydrometry	184.00	
Superintendence and accounts	9.00	
General expense	28.00	
		$400.00
Canal system:		
South branch cut-off canal ($37,500): Excavation class 1, dry, 32,000 cubic yards	4,608.00	
Concrete turnout, reinforced, 700 cubic yards	7,560.00	
Gates, etc	1,080.00	
Metal flume, 830 linear feet	10,872.00	
Concrete siphon, reinforced, 200 cubic yards	2,880.00	
Superintendence and accounts	1,875.00	
General expense	3,000.00	
Engineering and inspection	5,625.00	
Griffith Canal enlargement ($30,500): Excavation class 1, dry, 152,500 cubic yards	21,960.00	
Superintendence and accounts	1,525.00	
Engineering and inspection	4,575.00	
General expense	2,440.00	
		68,000.00
Lateral system:		
Second unit laterals ($1,700)—		
Excavation class 1, dry, 3,000 cubic yards	432.00	
Bridges, 5 M b. m	144.00	
Weirs (turnouts), 22.5 M b. m	648.00	
Superintendence and accounts	85.00	
Engineering and inspection	255.00	
General expense	136.00	
Third unit laterals ($4,300):		
Excavation class 1, dry, 7,000 cubic yards	1,008.00	
Bridges, 20 M b. m	576.00	
Weirs (turnouts), 52.5 M b. m	1,512.00	
Superintendence and accounts	215.00	
Engineering and inspection	645.00	
General expense	344.00	
		6,000.00

Estimated cost of contemplated work, Klamath project, during fiscal year 1918—Contd.

Features.	Estimated cost during fiscal year 1918.	
	Sub-feature.	Principal feature.
Drainage system:		
Open drains ($39,750)—		
Excavation class 1, dry, 164,750 cubic yards	$23,724.00	
Excavation class 2, dry, 4,000 cubic yards	2,016.00	
Bridges, 100 M b. m	2,880.00	
Superintendence and accounts	1,987.50	
Engineering and inspection	5,962.50	
General expense	3,180.00	
Closed drains ($26,250)—		
Excavation class 1, dry, 25,000 linear feet	10,440.00	
Back filling	1,980.00	
Pipe and laying	6,480.00	
Superintendence and accounts	1,312.50	
Engineering and inspection	3,937.50	
General expense	2,100.00	
		$66,000.00
Farm units: Salaries		600.00
Operation and maintenance during construction (water rental), 3,000 acres, at $1:		
Pine Grove District, carriage	500.00	
Above and under Adams Canal, carriage	250.00	
Tule Lake marginal lands, carriage	1,650.00	
Poe Valley, carriage	400.00	
Nuss Valley, carriage	200.00	
		3,000.00
Operation and maintenance under public notice, 40,000 acres, at $1:		
First unit—		
Carriage—		
Operation	2,500.00	
Maintenance	7,500.00	
Distribution—		
Operation	3,500.00	
Maintenance	8,000.00	
Second unit—		
Carriage—		
Operation	800.00	
Maintenance	1,200.00	
Distribution—		
Operation	1,000.00	
Maintenance	3,000.00	
Third unit—		
Carriage—		
Operation	800.00	
Maintenance	1,200.00	
Distribution—		
Operation	1,000.00	
Maintenance	3,000.00	
Drainage system—		
Closed drains—		
Operation	100.00	
Maintenance	900.00	
Open drains—		
Operation	100.00	
Maintenance	900.00	
Hydrometry—		
Operation	2,300.00	
Maintenance	200.00	
Guarding structures: Operation	2,000.00	
		40,000.00
Stores and other operations:		
Hospital—		
Medical and surgical supplies	50.00	
Services of physicians	295.00	
Hospital service	35.00	
Minor miscellaneous expense	20.00	
Mess-house operations, contract payments	600.00	
		1,000.00
Plant accounts:		
Construction plant and equipment: Excavator, drag line	5,000.00	
Engineering field plant: Instruments	50.00	
Miscellaneous equipment, etc.—		
Tents	400.00	
Miscellaneous tools	500.00	
Office plant: Office furniture	50.00	
		6,000.00
Total		191,000.00

SOUTH DAKOTA, BELLE FOURCHE PROJECT.

B. E. Hayden, project manager, Newell, S. Dak.

LOCATION.

Counties: Butte and Meade.

Townships: 6 to 10 N., Rs. 3 to 8 E., Black Hills meridian.

Railroads: Chicago & North Western; Chicago, Burlington & Quincy; Chicago, Milwaukee & St. Paul.

Railroad stations and estimated population January 1, 1917: Belle Fourche, 1,150; Newell, 370; Nisland, 150; Fruitdale, 100; Vale, 75.

WATER SUPPLY.

Source of water supply: Belle Fourche River.

Area of drainage basin: 4,265 square miles.

Annual run-off in acre-feet: Belle Fourche River at diversion dam (4,265 square miles), 1903 to 1916—maximum, 554,608; minimum, 119,860; mean, 317,870.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service is prepared to supply water, season of 1917: 83,335 acres.

Area under water-right applications, season of 1917: 65,214 acres.

Length of irrigation season: May 1 to October 1—152 days.

Average elevation of irrigable area: 2,800 feet above sea level.

Rainfall on irrigable area: 9 years, average, 15.01 inches; 1916, 15.11 inches.

Range of temperature on irrigable area: —38° to 103° F.

Character of soil of irrigable area: North side of Belle Fourche River principally heavy clay soil, with scattered areas of sandy clay loam; south side, sandy loam. All of the soils are heavy enough not to be disturbed by winds.

Principal products: Grain, corn, alfalfa, potatoes, garden truck, and sugar beets.

Principal markets: Omaha, Nebr.; Chicago, Ill.; and mining towns in the Black Hills.

LANDS OPENED FOR IRRIGATION.

Dates of public notices, regulations, and orders relating thereto: June 21, 1907; May 29, 1908; January 18, 1909; February 19 and November 26, 1910; January 24, March 9, May 4, and December 30, 1911; February 3 and May 2, 1912; February 26, June 23, and July 21, 1913; January 19, February 26, May 29, August 14, and September 24, 1914; April 10 and May 18, 1915; March 10, March 16, and July 6, 1916; January 9 and February 10, 1917.

Location: Tps. 7 to 10 N., Rs. 2 to 7 east.

Present status of lands opened: 35,217 acres entered subject to the reclamation act; 3,211 acres open to entry; 4,702 acres of State lands, 40,205 acres in private ownership. ship.

Limit of area of farm units: Public, 80 acres; private, 160 acres.

Duty of water: 1.5 acre-feet per acre per annum at the farm.

Building charge per acre of irrigable land: $30, $35, $40, and $45.

Annual operation and maintenance charge: For 1916, 90 cents per acre for first acre-foot of water, whether delivered or not, and 50 cents per acre-foot for additional quantities. For 1917, $1 per acre for first acre-foot of water, whether delivered or not, and 50 cents per acre-foot for additional quantities.

CHRONOLOGICAL SUMMARY.

Reconnoissance and preliminary surveys begun in 1903.

Construction recommended by board of engineers April 29, 1904.

Construction authorized by Secretary May 10, 1904.

Diversion dam and inlet canal completed September, 1907.

Belle Fourche Dam completed June, 1911.

First irrigation, season of 1908.

Entire project 93.9 per cent completed June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the Belle Fourche project provides for the diversion of water from the Belle Fourche River by means of a dam about 1½ miles below Belle Fourche, S. Dak., and an inlet or supply canal about 6½ miles in length into a storage reservoir controlled by the Belle Fourche Dam on Owl Creek, a tributary of the Belle Fourche River; the distribution of water from the inlet canal to a small area of land and the distribution of water from the reservoir through two canal systems to lands on both sides of the Belle Fourche River.

The United States claims all waste, seepage, spring, and percolating waters arising within the project, and proposes to use such water in connection therewith.

The features of the above irrigation plan completed are the diversion dam, headworks, inlet canal, Belle Fourche storage dam, south canal and laterals, north canal and all tributary laterals and structures. The features not yet constructed are Willow Creek and Nine Mile laterals and their tributaries, covering approximately 15,000 acres of land.

SUMMARY OF GENERAL DATA FOR BELLE FOURCHE PROJECT TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is complete		97,916
Public land entered to end of fiscal year	35,217	
Public land open to entry at end of fiscal year	3,211	
Public land withdrawn at end of fiscal year	14,581	
State land	4,702	
Private land	40,205	
Acreage service could have supplied season of 1916		78,591
Addition in fiscal year, 1917		4,744
Estimated acreage service can supply July 1, 1918		83,335
Acreage actually irrigated, season of 1916		48,468
Acreage cropped under irrigation, season of 1916		46,909
Crops:		
Value of irrigated crops, season of 1916		$557,319.00
Value of irrigated crops, per acre cropped		$11.88
Finances:		
Gross construction cost to end of fiscal year		$3,456,559.79
Per cent complete at end of fiscal year		93.9
Appropriated for fiscal year 1918, total		$274,000.00
Allotment for construction, fiscal year 1918		$4,000.00
Estimated per cent complete, June 30, 1918		93.9
Proposed appropriation, fiscal year 1919, for construction		$150,000.00
Estimated gross construction expenditures to June 30, 1919		$3,610,559.79
Estimated per cent complete, June 30, 1919		97
Announced construction charges per acre		$30; $35; $40; $45
Appropriation, fiscal year 1917		[1] $115,789.79
Expenditures during fiscal year, chargeable to 1917 appropriation—		
Disbursements	$101,410.15	
Transfers	523.91	
	$101,934.06	
Registered liabilities chargeable to 1917 appropriation	8,678.99	
		110,613.05
Unencumbered balance, July 1, 1917		5,176.74

[1] Includes balance of 1916 appropriation and refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

Repayments:	
Construction charges—	
Accrued to end of fiscal year	$228,810.72
Collected to end of fiscal year	209,161.64
Uncollected at end of fiscal year	19,649.08
Operation and maintenance charges (public notice)—	
Accrued to end of fiscal year	211,250.25
Collected to end of fiscal year	175,388.74
Uncollected at end of fiscal year	35,861.51
Water-rental charges—Collected to end of fiscal year	1,934.14
Drainage—Estimated acreage damaged by seepage to end of fiscal year	3,250

CONSTRUCTION DURING THE FISCAL YEAR.

The construction program for the fiscal year 1917 contemplated the completion of the work already underway on the North Canal and adjacent laterals which should have been done by the close of the previous fiscal year.

Curtis Bros., contractors on schedules 1 and 2 of North Canal and laterals, were under contract to finish by June 1, 1916, but did not complete their work until September 15. On account of the failure of Curtis Bros. to complete their contract in time, the Pacific Tank & Pipe Co. was delayed and did not finish work until July 9.

All smaller laterals and structures were built by Government forces and the work done during the current fiscal year consisted of finishing up and tying in what had been planned for the previous year. This was accomplished and camp closed down in the early part of November, 1916.

SEEPAGE AND DRAINAGE.

The matter of providing drainage for about one-third of the project or that portion lying south of the Belle Fourche River, together with the section between the Belle Fourche River and Indian Creek, was taken up with the Denver office and the drainage engineer, and it was decided to make preliminary investigations and estimates to submit to the people for their consideration.

Test wells were put down in all of the principal seeped areas and readings taken of the depth to ground water. It was found that on an area of 1,625 acres, water was within 5 feet of the surface and that crops for the most part had been seriously affected; also it was estimated that approximately 9,000 acres were threatened by a high water-plane.

The drainage engineer made three trips to the project during the year, and on his last trip, during the second week in March, 1917, together with the project manager, worked up the data secured and made a preliminary estimate of the cost of an adequate drainage system for this section of the project. The estimate indicates that it will take about $12 per acre to construct the proposed project.

It is the intention to submit this estimate to the people for a vote as soon as a decision is reached as to the method of procedure—i. e., whether under the extension act as supplemental construction or under the irrigation district law.

OPERATION AND MAINTENANCE.

Water supply.—The water supply for the season of 1916 was more than adequate for all requirements. The total flow of the Belle Fourche River was 350,618 acre-feet. Storage at the beginning of the season was 159,100 acre-feet and at the close was 31,000 acre-feet. On account of the repairs to the pavement of the Belle Fourche Dam approximately 75,000 acre-feet were wasted, and during a considerable period the total flow of the river was allowed to pass over the diversion dam.

The number of farms furnished with water during the season was 802, comprising an irrigable area of 60,035 acres; of this 46,909 acres were cropped and 48,468 acres irrigated; 39,133 acre-feet of water were delivered.

The water supply for the season of 1917, while entirely adequate for lands under the reservoir, is not so promising for the 3,500 or more acres which are dependent on the direct flow in the Belle Fourche River. On June 30 the flow in the river was still in excess of the demand for irrigation, but was dropping rapidly. Storage in the reservoir at that date amounted to 145,000 acre-feet, which is considerably in excess of the probable requirement.

Maintenance.—The maintenance work of the project was carried on from three principal stations, Newell, Orman, and Vale, with a foreman in charge of each camp. These foremen are in charge of crews varying in size, according to the time of the year, from 3 or 4 to 35 or 40 men. Small ditches are cleaned for the most part with Martin steel V ditchers, which have proven very economical and convenient.

The only unusual maintenance feature was the repair of the pavement on the Belle Fourche Dam. On May 10, 1916, a 60-mile windstorm, which lasted for more than 24 hours, destroyed large sections of the concrete pavement on the face of the dam, necessitating extensive repairs and remodeling; 366 blocks were dislodged and many more were lifted out of position.

Temporary work costing $2,726.19 was done immediately in order to prevent further damage. This work consisted in grouting in place the blocks as they lay.

It was evident that some scheme for fastening the blocks together to make them interdependent would have to be adopted. After considerable discussion and correspondence relative to the matter it was decided that all courses from the nineteenth to the top of the dam should be taken up and relaid, with the greater length up and down the slope. A 2-inch open joint was left between the blocks on all sides for filling with cement mortar. The blocks between the thirteenth and nineteenth courses were not disturbed, but the joints were Vd out with air drills to a depth of about 5 inches and filled with mortar.

This work was begun on September 1, and was completed, except for slight repairs to the gatehouses, on November 18. The work was prosecuted with three shifts, comprising in all about 90 men. A decided shortage of labor caused considerable apprehension at first, but by advertising extensively and shipping in a few men a full crew was maintained. The cost of these repairs, in addition to temporary work referred to above, amounted to $33,187.93, which was carried

on the books as supplemental construction under operation and maintenance.

On account of the necessity of using every available man for repairing the dam, little regular maintenance work was accomplished during the fall months. A special effort was made in the spring to put all ditches and structures in good condition for the season's run, and fair success was attained in spite of a late, wet spring and a decided shortage of labor.

Historical review, Belle Fourche project.

Item.	1912	1913	1914	1915	1916	[1] 1917
Acreage for which service was prepared to supply water	65,852	65,852	68,852	78,591	78,591	83,335
Acreage irrigated	27,897	32,881	37,454	44,067	48,468	51,000
Miles of canal operated	440	462	498	528	529	625
Water diverted (acre-feet)	166,835	124,275	145,284	135,804	58,395	.....
Water delivered to canal (acre-feet)	30,390	47,349	54,262	16,484	39,133	.....
Per acre of land irrigated (acre-feet)	1.10	1.44	1.45	0.37	0.81	.....

[1] To June 30, 1917, estimated.

SETTLEMENT.

For the past two years calls for land have been more frequent than formerly and settlement has progressed satisfactorily. On June 30, 1916, 56 farm units remained unentered. On February 8, 1917, the fifth unit of the project, comprising 39 farm units was opened to settlement. On June 30, 1917, there were 43 unentered units, of which not more than half will make desirable farms.

A little more than the usual activity was shown in the exchange of private lands of the project, the price ranging from $40 to $75 for improved property.

Settlement data, Belle Fourche project.

Item.	1915	1916	1917 [1]
Total number of farms on project	1,292	1,292	1,292
Population	2,375	2,375	2,400
Number of irrigated farms	717	802	825
Operated by owners or manager	462	495	553
Operated by tenants	255	249	260
Population	1,877	2,067	2,150
Number of towns	5	5	5
Population	2,050	1,775	1,845
Total population in towns and on farms	4,425	4,150	4,245
Number of public schools	23	23	23
Number of churches	11	11	11
Number of banks	9	9	9
Total capital stock	$140,000	$140,000	$140,000
Total amount of deposits	$1,145,731	$1,756,211	.....
Total number of depositors	3,728	4,228	.....

[1] To June 30, 1917, estimated.

PRINCIPAL CROPS.

The principal crops grown on the Belle Fourche project are alfalfa, wheat, oats, barley, corn, potatoes, flax, sugar beets, and garden truck.

Crop returns for 1916 showed an increase in value over the previous year of $95,292, and would have been considerably greater but for the almost total destruction of the small-grain crop by rust. The total crop returns for 1916 amounted to $557,319, or $11.88 per acre. A little more than 6,000 acres of crop were seriously damaged by hail in the vicinity of Arpan.

The late, wet spring of 1917 greatly delayed the planting of crops and hindered the general development of the project. Labor, too, was scarce, all of which resulted in a smaller cropped area than had been hoped for.

Crop report, Belle Fourche project, South Dakota, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay	17,945	Ton	36,765	2.0	$7.00	$257,355	$14.34
Alfalfa seed	4,177	Bushel	5,320	1.3	8.00	42,560	10.19
Barley	2,740	...do	42,804	15.6	.70	29,963	10.94
Beans	23	...do	191	8.3	3.00	573	24.90
Beets, sugar	161	Ton	1,515	9.4	4.50	6,818	42.34
Clover hay	48	...do	78	1.6	8.00	624	13.00
Corn	3,846	Bushel	75,588	19.6	.80	60,470	15.72
Corn fodder	326	Ton	733	2.2	5.00	3,665	11.24
Flax	493	Bushel	2,276	4.6	2.00	4,552	9.23
Garden	116					5,080	43.80
Hay, native	2,121	Ton	1,749	.8	9.50	16,615	7.83
Millet seed	48	Bushel	305	6.4	1.00	305	6.35
Oats	4,119	...do	91,767	22.1	.40	36,707	8.91
Onions	1	Bushel	4	4.0	1.00	4	4.00
Pasture	6,132					27,826	4.55
Potatoes	169	Bushel	14,002	83.0	1.00	14,002	82.85
Rye	72	...do	1,392	19.4	1.00	1,392	19.33
Wheat	7,554	...do	38,222	5.1	1.25	47,778	6.32
Miscellaneous	176					1,030	5.85
Less duplicated areas	3,358						
Total cropped acreage	46,909	Total and average				557,319	11.88

Areas.	Acres.	No. farms.	Per cent of project.[1]
Irrigated, no crop:			
Total irrigable area farms reported	60,035	802	61.3
Young alfalfa—			
Total irrigated area farms reported	48,468	802	49.5
With nurse crop	200		
Under water-right applications	48,468	802	49.5
Without nurse crop	1,481		
Total cropped area farms reported	46,909	802	47.9
Orchard	78		
Less duplicated areas	200		
Total irrigated acreage	48,468		

[1] Based on 97,916 acres.

PUBLIC NOTICES AND ORDERS.

PUBLIC NOTICE, JULY 6, 1916.

1. Certain lands within the limits of the Belle Fourche project, South Dakota, now subject both to public notice and to trust deeds executed on or before January 24, 1911, have not been included in water-right applications duly filed.

2. Under public notices heretofore issued an increase in building charge from $30 per irrigable acre to $40 per irrigable acre, was made

effective as to these lands in case of failure to make water-right application within a specified period.

3. In order to afford the owners of these lands an opportunity to file water-right application in accordance with the conditions contemplated by paragraph 4 of the contract between the Secretary of the Interior and the Belle Fourche Valley Water Users' Association dated January 24, 1911, notice is hereby given that water-right applications will be received from the owners of such lands subject to the provisions of public notices and orders heretofore issued at a charge for building the irrigation works of $30 per irrigable acre.

4. In case water-right applications for such lands are not duly made within one year from the date hereof, the Secretary of the Interior will call upon the Belle Fourche Valley Water Users' Association to execute the provisions of the trust deed in regard to the disposition of said lands at public sale to qualified persons who shall be required to file water-right application.

5. In all cases where water-right application has been made at a building charge of $40 per acre for lands which on or before January 24, 1911, were signed under contract with the Belle Fourche Valley Water Users' Association or held under trust deed by such association, it is hereby ordered that the building charge specified therein shall be reduced to $30 per acre and appropriate credits shall be made upon the accounts of such water-right applicants.

6. The provisions of public notices and orders heretofore issued are hereby modified as to any provision in conflict herewith.

ANDRIEUS A. JONES,
First Assistant Secretary of the Interior.

PUBLIC NOTICE, JANUARY 9, 1917.

1. In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof, and supplemental thereto, and particularly the reclamation extension act of August 13, 1914 (38 Stat., 686), public notice for the fifth unit of the Belle Fourche project, South Dakota, is hereby issued, as follows:

2. *Lands for which water will be furnished.*—Water will be furnished under said project in the irrigation season of 1917, and thereafter, for the irrigable lands of the fifth unit shown on the farm unit plats of the following townships of the Black Hills meridian, to wit: T. 8 N., R. 6 E.; T. 8 N., R. 7 E.; T. 9 N., R. 6 E.; T. 9 N., R. 7 E.; T. 10 N., R. 6 E.; which plats were approved by the Secretary of the Interior on September 9, 1916, and are on file at the local land office at Belle Fourche, S. Dak., and at the office of the project manager at Newell, S. Dak.

3. *When and how to make entry for public land.*—Homestead entries for the farm units shown on said plats embracing public lands of the United States may be made on and after February 8, 1917, at 9 o'clock a. m., at said local land office at Belle Fourche, S. Dak. Every person desiring to acquire any of said public lands must execute a homestead application subject to the provisions of the reclamation law in manner required by law, which, with the required fees and commissions, accompanied by certificate of the project

manager as to the filing of water-right application and payment of water-right charges as hereinafter provided, must be presented to said local land office, in person, by mail, or otherwise, within a period of 5 days prior to February 8, 1917, that is, beginning not earlier than February 3, 1917. Applications presented after 9 o'clock a. m., February 8, 1917, will be filed and noted in the order of their receipt.

4. *Simultaneous filings for public lands.*—Applications reaching said local land office at or prior to 9 a. m., February 8, 1917, will be held and treated as simultaneously filed, and the register and receiver will dispose of them as follows:

(*a*) Where there is no conflict the application will be allowed, irrespective of whether settlement is alleged.

(*b*) In case of conflicting applications and only one of the applicants alleges prior settlement, his application will be allowed and the others rejected.

(*c*) If two or more conflicting applications, each containing allegations of prior settlement, are received, a hearing, restricted to those alleging such right, will be ordered to determine the priority of right.

(*d*) Where there are conflicting applications in which no one of the several applicants claims prior settlement the register and receiver will write on cards the names of the several applicants, and each of these cards will be placed in an envelope upon which there is no distinctive or identifying mark, and at 2 o'clock p. m., on the date of opening to entry, if practicable (if not, at the same hour one day later), after all the envelopes containing the names of the several applicants shall have been thoroughly mixed in the presence of such persons as may desire to be present, they will be drawn and numbered in order. The cards as drawn and numbered will be securely fastened to the applications of the respective persons, and the applications will be allowed in such order. Applications conflicting in whole with those previously allowed will be rejected in the usual manner.

5. *Failure of applicant to obtain public land.*—Where any applicant fails to obtain land applied for by him he will be permitted to elect whether he will amend his application to embrace other lands not affected by pending applications and otherwise subject thereto when such amended application is presented, or withdraw his original application without prejudice. In the event of such withdrawal the fees and commissions will be returned by the receiver, and the water-right charges deposited will be returned by the project manager.

6. *Warning against unlawful settlement upon public land.*—No person will be permitted to gain or exercise any right whatever under any settlement or occupation of any of said public lands, begun at or prior to 9 a. m., February 8, 1917: *Provided, however,* That this will not affect any valid existing right obtained by settlement or entry while the land was subject thereto. Any application not based on a prior settlement right will be subject to valid settlement claims asserted in the manner required by law.

7. *Limit of area for which water right may be secured.*—The limit of area per entry representing the acreage which, in the opinion of the Secretary of the Interior, may be reasonably required for the support of a family upon such lands, is fixed at the amounts shown upon the plats for the several farm units. The maximum limit of area for which water-right application may be made for lands in

private ownership shall be 160 acres of irrigable land for each land owner.

8. *Applications for water rights.*—All water-right applications, whether for public or private lands, must be made to the project manager, United States Reclamation Service, Newell, S. Dak., upon forms provided for that purpose, and may be made at any time on or after date of this notice. Every application must be accompanied by the proper initial water-right payment, which will be accepted by the project manager in the form of New York draft or money order payable to special fiscal agent, United States Reclamation Service, Newell, S. Dak., or in currency. In the case of public lands, each water-right application must be for a specific farm unit, and more than one person may make such application for the same farm unit. A certificate of filing will be issued each applicant by the project manager. Filing of water-right application and issuance of certificate give no preference right to entry on public lands. Only when the project manager is notified by the local land office that an entry has been allowed, will acceptance of the water-right application be indorsed thereon. Whereupon all other water-right applications affecting the farm unit in question, with payments made, will be returned to the respective applicants, upon surrender by them of the certificates of filing issued by the project manager.

9. *Classes of charges for water rights.*—The water-right charges are of two kinds, to wit: (*a*) A charge against each irrigable acre to cover cost of construction of the irrigation system; and (*b*) an annual charge against each irrigable acre to cover cost of operation and maintenance of the system.

10. *Construction charges for lands entered or pledged on or before January 24, 1911.*—In accordance with contract of January 24, 1911, between the Secretary of the Interior and the Belle Fourche Valley Water Users' Association, lands entered or held under trust deed or signed under contract with the Belle Fourche Valley Water Users' Association on or before January 24, 1911, shall be subject to a construction charge of $30 per acre of irrigable land shown on said plats payable in 10 annual installments, graduated as follows: First installment, $1 per acre; second installment, $2 per acre; third to eighth installments, inclusive, $3 each per acre; ninth installment, $4 per acre; and tenth installment, $5 per acre. The first installment shall become due on December 1, 1917, and subsequent installments shall become due on December 1 of each year thereafter: *Provided*, That if acceptance of the terms of the reclamation extension Act of August 13, 1914 (38 Stat., 686), or water-right application thereunder, is filed for land referred to in this section, within six months of the date of this notice, such land will be subject to a construction charge of $30 per acre of irrigable land, divided into 20 annual installments, the first of which shall become due and payable on December 1, 1917, and subsequent installments on December 1 of each year thereafter. The first four of such installments shall each be 2 per cent of the construction charge or 60 cents per acre, the next two installments shall each be 4 per cent or $1.20 per acre, and the next 14 installment 6 per cent or $1.80 per acre of irrigable land: *Provided further*, That if water-right application for any tract of land referred to in this section is not duly made on or before one year after the date of this notice, the Secretary of the Interior will call upon the Belle Fourche

Valley Water Users' Association to execute the provisions of the trust deed in regard to the disposition of such of said lands for which water-right application shall not have been made, at public sale, to qualified persons, who will be required to file water-right application.

11. *Construction charges for lands pledged after January 24, 1911, and on or before August 13, 1914.*—For lands held under trust deed or signed under contract with the Belle Fourche Valley Water Users' Association after January 24, 1911, and on or before August 13, 1914, the construction charge shall be $45 per irrigable acre, payable in 10 annual installments and graduated as follows: First and second installments, $2 each per acre; third and fourth installments, $3 each per acre; fifth and sixth installments, $4 each per acre; seventh and eighth installments, $5 each per acre; and ninth and tenth installments, $8.50 each per acre. The first installment shall become due December 1, 1917, and subsequent installments shall become due on December 1 of each year thereafter: *Provided*, That if acceptance of the terms of said reclamation extension act of August 13, 1914, or a water-right application thereunder, is filed for land referred to in this section within six months of the date of this notice, such land will be subject to a construction charge of $45 per acre of irrigable land, divided into 20 annual installments, the first of which shall become due and payable on December 1, 1917, and subsequent installments on December 1 of each year thereafter. The first four of such installments shall be each 2 per cent of the construction charge or 90 cents per acre, the next two installments shall be each 4 per cent or $1.80 per acre, and the next 14 installments shall be each 6 per cent or $2.70 per acre.

12. *Construction charges for lands entered or pledged after August 13, 1914.*—For homestead entries made after August 13, 1914, and land in private ownership signed after that date, under contract with the Belle Fourche Valley Water Users' Association, water-right application will be accepted at a construction charge of $45 per acre of irrigable land. A payment of 5 per cent of the total, or $2.25 per irrigable acre, must be made at time of entry or filing water-right application. The remainder of the construction charge—to wit, $42.75 per irrigable acre—must be paid in 15 annual installments, the first five of which shall be 5 per cent of the total or $2.25 each, and the remaining 10 installments 7 per cent of the total, or $3.15 each, per irrigable acre. The first annual installment becomes due December 1 of the fifth calendar year after the year in which the initial payment is due; subsequent installments become due on each December 1 thereafter.

13. *Increased construction charges in certain cases.*—In all cases where water-right application for lands in private ownership or for lands under entries not subject to the reclamation act, shall not be made within one year from the date of this notice, the construction charge for such land shall be increased 5 per cent each year until such application is made and an initial installment is paid.

14. *Operation and maintenance charges.*—The operation and maintenance charges upon the fifth unit for the irrigation season of 1917 shall be of the amount in effect for other lands of the project in the same season, and shall be due March 1, 1918. The operation and maintenance charges of future years will be duly announced. They

will be payable on March 1 of each year for the preceding irrigation season, except that when original water-right application is filed after June 15, in any year, the first payment of such charge becomes due March 1 of the second year thereafter.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

PUBLIC NOTICE, FEBRUARY 10, 1917.

1. *Annual operation and maintenance charges.*—In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and of acts amendatory thereof and supplementary thereto, and particularly of the reclamation extension act of August 13, 1914 (38 Stat., 686), announcement is made that the minimum annual operation and maintenance charge for the irrigation season of 1917 and thereafter until further notice, against all lands of the Belle Fourche project, South Dakota, under public notice, shall be $1 per irrigable acre whether water is used thereon or not, which charge will permit the delivery prior to June 26 of such an amount of water per acre as can be beneficially used, and the delivery on and subsequent to June 26 of not to exceed 1 acre-foot per acre. Additional water will be furnished at the rate of 50 cents per acre-foot. All operation and maintenance charges will be payable on March 1 of each year for the preceding irrigation season, except that when original water-right application is filed after June 15 in any year the first payment of such charge becomes due March 1 of the second year thereafter.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix, p. 517.]

Feature costs of Belle Fourche project to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys		$806.09
Storage works:		
Diversion dam		117,322.76
Feed canal		333,181.36
Belle Fourche Dam		1,235,177.32
		1,685,681.44
Canal system:		
North Canal	$11,687.62	505,875.22
South Canal		491,346.50
	11,687.62	997,221.72
Lateral system:		
Laterals, Division A		252,545.21
Laterals, Division B		129,230.17
Laterals, Division C		67,710.43
Laterals, Division D	14,078.65	133,864.19
Nine Mile Extension	3,589.54	40,950.07
Willow Creek Lateral		789.56
	17,668.19	625,089.63
Drainage system: Surveys and test wells	2,292.74	3,079.95
Farm units: Surveys		6,246.64

Feature costs of Belle Fourche project to June 30, 1917—Continued.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Permanent improvements:		
Buildings		$38,413.79
Real estate and permanent improvements		54,107.10
		92,520.89
Telephone system	$340.22	14,583.67
Plant accounts	1,602.54	15,909.53
Operation and maintenance charges transferred to and compounded with construction charges	2,417.06	15,420.23
Gross construction cost to June 30, 1917	36,008.37	3,456,559.79
Less revenues earned during construction period:		
Rental of buildings		4,248.40
Rental of grazing and farming lands		2,661.90
Rental of telephones and tolls		87.48
Contractors' freight refunds	267.70	2,883.92
Forfeitures by defaulting bidders and contractors	1,305.98	8,643.48
Other revenues, unclassified	1.50	46.50
Profit on mess-house operations	[1] 533.36	[1] 3,992.93
Profit on mercantile store operations	52.92	1,741.08
Profit on hospital operations	575.95	2,709.59
	1,670.69	19,029.42
Net cost of construction of project to June 30, 1917		3,437,530.37

[1] Deduct.

Statement of cost by calendar years, Belle Fourche project.

Year ending Dec. 31—	Construction	Operation and maintenance under public notice.	Total cost.
1909	$2,275,751.06		$2,275,751.06
1910	372,235.93		372,235.93
1911	438,213.28	$96,682.90	534,896.18
1912	61,906.76	58,911.39	120,818.15
1913	32,935.37	55,737.46	88,672.83
1914	107,097.36	60,060.62	167,157.98
1915	69,874.22	47,542.16	117,416.38
1916	78,098.73	42,106.36	120,205.09
January to June 30, 1917	4,537.55	25,939.97	30,477.52
Plant accounts to June 30, 1917	15,909.53		15,909.53
Total	3,456,559.79	386,980.86	3,843,540.65

Statement of cost by fiscal years, Belle Fourche project.

Year ending June 30—	Construction.	Operation and maintenance under public notice.	Total cost.
1910	$2,422,853.38		$2,422,853.38
1911	467,295.63		467,295.63
1912	254,448.01	$123,399.85	377,847.86
1913	[1] 2,104.72	60,392.66	58,287.94
1914	73,888.75	52,594.44	126,483.19
1915	109,944.28	55,748.66	165,692.94
1916	79,919.10	40,943.59	120,862.69
1917	36,008.37	53,901.66	89,910.03
Plant accounts to June 30, 1916	14,306.99		14,306.99
Total	3,456,559.79	386,980.86	3,843,540.65

[1] In March, 1913, credit was allowed for miscellaneous preliminary investigations in the amount of $16,818.04, or $2,104.72 in excess of construction costs for that year.

Estimated cost of contemplated work, Belle Fourche project, during fiscal year 1918.

Features.	Estimated cost during fiscal year 1918.	
	Subfeature.	Principal feature.
Lateral system: Nine Mile	$123,485	$123,485
Drainage system	50,000	50,000
Operation and maintenance under public notice:		
Operation	24,600	
Maintenance	58,400	
		83,000
Total		256,485

UTAH, STRAWBERRY VALLEY PROJECT.

J. L. Lytel, project manager, Provo, Utah.

LOCATION.

Counties: Utah and Wasatch.

Townships: 8, 9, and 10 S., Rs. 1 to 3 E., Salt Lake base and meridian.

Railroads: Denver & Rio Grande; Salt Lake Route; Salt Lake & Utah R. R.

Railroad stations and estimated population January 1, 1917: Payson, 3,000; Spanish Fork, 3,600; Springville, 3,700; Provo, 10,500.

WATER SUPPLY.

Source of water supply: Strawberry and Spanish Fork Rivers and a number of small streams and springs not on the watersheds of these two. Contemplated pumping plants.

Area of drainage basins: Strawberry River, including Indian and Trail Hollow Creeks, 175 square miles; Spanish Fork River, 670 square miles.

Annual run-off in acre-feet: Strawberry River into Strawberry Reservoir, including Indian and Trail Hollow Creeks, 1903 to 1912, maximum 150,000, minimum 49,000, mean 77,500; 1913 to 1916 (net inflow), maximum 104,000, minimum 35,000, mean 70,000. Spanish Fork River at Spanish Fork, 1903–1916, maximum 227,000, minimum 65,000, mean 121,000.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service is prepared to supply water during the season of 1917: 50,000 acres; reservoir full with 250,000 acre-feet available for irrigation purposes.

Length of irrigating season: April 15 to September 30—169 days.

Average elevation of irrigable area: 4,600 feet above sea level.

Rainfall on irrigable area: At Provo, average, 20 years, 14.5 inches; 1916, 20.56 inches.

Rainfall at Strawberry Reservoir: Average, 4 years, 21.43 inches; 1916, 21.54 inches.

Range of temperature on irrigable area: —10° to 95°; mean temperature at Provo, 49° F.

Character of soil on irrigable area: Sandy loam, heavy clay, and varying mixture of both; black alluvium; loam; and gravel. Much of the soil is underlaid by a coarse gravel, and the natural drainage is excellent.

Principal products: Alfalfa, hay, cereals, sugar beets, fruits, vegetables.

Principal markets: Salt Lake City, Utah, and adjacent towns and mining districts.

LANDS OPENED FOR IRRIGATION BY PUBLIC NOTICE.

	Acres.
Spanish Fork unit, Oct. 9, 1915; May 9, 1916; May 29, 1917	31,351.84
Lake Shore unit, Oct. 8, 1915; May 9, 1916; May 29, 1917	5,862.97
High Line unit, May 13, 1916, and May 21, 1917	21,534.84
	58,749.65

In addition the service has contracted to sell to Clinton, Soldier Fork, and Diamond Fork units, a total of 878.4 acre-feet of water per annum; also 200 acre-feet to Payson City and 400 acre-feet to Spanish Fork City.

CHRONOLOGICAL SUMMARY.

Reconnoissance and preliminary surveys begun in 1903.

Construction recommended by board of engineers October 2, 1905.

Construction authorized by Secretary December 15, 1905.

Excavation of tunnel completed June 20, 1912.

Storing of water in Strawberry Reservoir begun July 14, 1912.

Construction of Indian Creek Dike completed September, 1912.

Strawberry Tunnel formally opened September 13, 1913.
Construction of Strawberry Dam completed September 20, 1913.
Construction started on High Line Canal, January, 1915.
First storage water used for irrigation, June 27, 1915.
Divisions 1 to 9, distribution system, practically completed December 31, 1915.
Water turned down High Line Canal and used for irrigation April 17, 1916.
High Line Canal turned over to water users April 24, 1916.
Project as a whole 90 per cent completed June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the Strawberry Valley project provides for the storage of water in a reservoir on the Strawberry River; the discharge of the stored water through the Strawberry tunnel, approximately 3¾ miles long, into Diamond Fork, a tributary of the Spanish Fork River; and the diversion of water from the Spanish Fork River into canal systems, watering lands east and south of Utah Lake, in Utah County. A hydroelectric plant on the south side of the river supplies power for construction and commercial purposes. Part of the power developed may ultimately be used for pumping water for irrigation of highlands and drainage of lowlands. The United States claims all waste, seepage, unappropriated spring and percolating water arising within the project, and purposes to use such water in connection therewith.

On the High Line unit, where an area of 25,000 acres, the greater part of which at present has no water right, will be irrigated, a complete canal system will be constructed by the United States, and on the Spanish Fork and Lake Shore units, where a supplemental supply will be furnished for a large acreage, the existing canal systems will be used. Any necessary enlargements or extensions will be made by the water users comprising the various canal companies, for according to the terms of the contract between the United States and the canal companies, the responsibility of the United States ends with the delivery of the water at the heads of the various canals. In the case of the Soldier Fork, Diamond Fork, and Clinton districts, water belonging to appropriators below the confluence of Diamond Fork with the Spanish Fork River is used by persons above this point, and an equal amount of water is released from the Strawberry Reservoir for the benefit of the prior appropriators. The water users build all of the ditches and other irrigation structures themselves.

The completed features of the irrigation plan are: Diversion Dam on the Spanish Fork River, Power Canal, the first unit of the hydroelectric power plant on the Spanish Fork River, Strawberry Dam, all of the canal system of the High Line unit, including all canals and laterals irrigating Goshen Valley and the land between the west side of West Mountain and Utah Lake, and the following features in connection with the Strawberry Reservoir: Strawberry Dam, Indian Creek Dike, Indian Creek and Trail Hollow feeder Canals and appurtenant structures, and the East Portal camp. In connection with the construction of these features 55 miles of wagon road, 44 miles of telephone lines, and 49½ miles of high-tension transmission lines have been built. Power from the United States Reclamation Service power house is being supplied to the cities of Payson, Spanish Fork, and Salem for lighting and commercial purposes. The United States built the high-tension lines from the power house to these towns, and the towns built their own substations and transmission lines.

In accordance with the present plans, the work remaining to be done on the project consists of the construction of Mapleton lateral and the extension of the High Line unit in Goshen Valley to Current Creek. This construction work, however, is dependent upon the formation of irrigation districts under the State laws before work will be started. At the present time it seems probable that the construction of Mapleton lateral will be undertaken before the end of the first half of the fiscal year.

No construction will be done on the Spanish Fork or Lake Shore units, as the contracts with the canal companies on the units provide that the water from the project shall be delivered to the head of the several existing canals and the companies shall deliver it from these points to the lands.

SUMMARY OF GENERAL DATA FOR STRAWBERRY VALLEY PROJECT TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is complete		50,000
Public land entered at end of fiscal year	1,414	
Public land open to entry at end of fiscal year	486	
Private land	48,100	
Acreage service could have supplied season of 1916		38,500
Addition in fiscal year, 1917		5,000
Estimated addition in fiscal year, 1918		6,500
Estimated acreage service can supply July 1, 1918		50,000
Acreage actually irrigated, season of 1916		30,722
Acreage cropped under irrigation, season of 1916		25,066
Crops:		
Value of irrigated crops, season of 1916		$1,320,135.00
Value of irrigated crops, per acre cropped		$52.70
Finances:		
Gross construction cost to end of fiscal year		$3,384,529.39
Per cent complete at end of fiscal year		90
Appropriated for fiscal year 1918, total		$170,000.00
Allotment for construction, fiscal year 1918		$21,000.00
Estimated per cent complete, June 30, 1918		91
Estimated gross construction expenditures to June 30, 1918		$3,405,529.39
Announced construction charges per acre, High Line unit		$80.00
Spanish Fork unit		$90.00
Appropriation, fiscal year 1917		[1] $358,501.29
Expenditures during fiscal year, chargeable to 1917 appropriation—		
Disbursements and transfers	$261,909.49	
Registered liabilities chargeable to 1917 appropriation	11,039.79	
Contract obligations wholly covered by 1917 appropriation	47,147.83	
		$320,097.11
Unencumbered balance, July 1, 1917		$38,404.18
Repayments:		
Construction charges—		
Accrued to end of fiscal year		$49,333.57
Collected to end of fiscal year		$47,258.84
Uncollected at end of fiscal year		$2,074.73
Operation and maintenance charges (public notice)—		
Accrued to end of fiscal year		$21,252.46
Collected to end of fiscal year		$19,851.72
Uncollected at end of fiscal year		$1,400.74
Water-rental charges—		
Accrued to end of fiscal year		$1,097.63
Collected to end of fiscal year		$1,097.63
Power earnings—		
Accrued to end of fiscal year		$46,281.82
Collected to end of fiscal year		$45,198.97
Uncollected at end of fiscal year		$1,082.85

[1] Includes refunds authorized to be added to 1917 appropriations by sundry civil act of July 1, 1916.

CONSTRUCTION DURING FISCAL YEAR.

STORAGE WORKS.

Strawberry Dam, clay blanketing.—After the completion of Strawberry Dam it was noticed that seepage through the dam considerably increased after the water in the reservoir had risen to the approximate elevation of 7550. An investigation of this increase in the flow of water revealed the fact that a small quantity of water was percolating through fissures in the rock at the south end of the dam. It was therefore decided to cover the surface with a clay blanket and cut off as far as possible this flow of water. As a result of this clay blanketing the seepage has materially decreased until at the present time it is practically negligible.

Work on this feature was begun about July 25 and completed in September, during which time approximately 5,100 cubic yards of class 1 material were placed on the upstream face of Strawberry Dam at the south end.

Concrete lined wasteway.—Work on this feature was commenced during August and completed about September 10. Approximately 500 cubic yards of concrete were placed during this time. The reason for lining the wasteway was to prevent excessive seepage through the sides of the wasteway on the lower slope of the dam, and to insure its satisfactory operation.

Material through which this wasteway was excavated consisted mainly of seamy siliceous lime stone which rapidly decomposed under atmospheric conditions. It was thought that water passing down the wasteway would flow through these seams in the rocks and cause the down stream slope of Strawberry Dam on the north side to become saturated to such an extent as to cause a slide in the earth embankment. In order to prevent any possibility of this occurring it was deemed advisable to line the wasteway for its entire length with a 6-inch layer of concrete, approximately 600 feet long, 18 feet wide, and 4 feet high.

On May 25, 1917, this wasteway became operative for the first time when Strawberry Reservoir overflowed. The wasteway discharged continuously for about 30 days, reaching a maximum of approximately 400 second-feet on or about June 5.

POWER SYSTEM.

Power Canal.—Work started on the beam and slab covering on September 14 and was finished about December 15, during which time approximately 685 feet of canal were covered, 719 cubic yards of concrete placed, and 1,025 cubic yards of excavation and back fill handled. The object of this construction was to provide security for operating during the winter months and prevent snow slides and sloughing material from the steep side hill cuts from entering the canal. This work was first started in 1913 and has been continued at intervals from that time to the present, but with the completion of the work done this fiscal year it is thought that no more work of this nature will be necessary.

On March 8, 1917, a board of engineers consisting of Messrs. R. F. Walter, senior engineer; J. M. Gaylord, electrical engineer; J. L. Lytel, project manager; Barry Dibble, project manager; and A. J.

Wiley, consulting engineer, met at Provo for the purpose of considering the leasing of the United States Reclamation Service power plant at the mouth of the Spanish Fork Canyon.

The question of the original cost of the plant, the depreciation to date, and the present value of the plant, were carefully considered by the board. The proportionate part of the power canal directly chargeable to the power system was gone into in detail and a final report made by the board under date of March 8.

Specifications covering the lease of this plant were issued on July 13, and proposals will be received until August 10, 1917.

CANAL SYSTEM.

High Line Canal.—As a result of the operation of the High Line unit for the irrigation season of 1916 several places along the High Line Canal developed weaknesses. As a result of these defects, as well as a petition from the High Line Canal Co. for certain improvements and additional construction, a board of review, consisting of Messrs. R. F. Walter, senior engineer; A. J. Wiley, consulting engineer; and J. L. Lytel, project manager, was called and considered these matters. It was decided to construct lined canal at various places along the High Line Canal, to build an additional turnout at turnout No. 9, to raise the head walls on the Denver & Rio Grande Railroad Co. siphon at Goshen Pass, to construct measuring devices at turnouts on lateral No. 33, and to repay to the High Line Canal Co. the sum of $770 for damages incurred through seepage on lateral No. 33.

High Line Canal, Division No. 10.—Bids were opened on June 15, 1916, for the construction of division No. 10 High Line Canal. Contract was awarded July 21 to the Reynolds-Ely Construction Co., involving approximately $130,000. Work was actively commenced in August, and by December 31 was 80 per cent completed. Bad weather and lack of efficient labor prevented the completion of this division on November 1, the date set for completion. Four extensions of time were granted, and construction work was finally completed on June 10, 1917. The work on this contract consisted of the construction of laterals and sublaterals in connection with the extension of the canal system of the High Line unit. The canals are located in Goshen Valley and are a part of the system used to supply water to private and Government lands in Goshen Valley.

SURVEYS AND INVESTIGATIONS.

Hydrographic investigations were carried on for the purpose of keeping the records to date of all the streams heretofore measured and that are connected with the water supply of the project.

Fifty gaging stations were maintained and 325 measurements made during the irrigation season. One hydrographer and an assistant kept careful record of the amount of water delivered to the various canal companies, at the same time making miscellaneous measurements at the various gaging stations.

All the necessary engineering work, both field and office, in connection with the construction of division No. 10 on the High Line Canal distribution system was done as required.

Many new water-right applications and transfers of old water-right applications were received.

The farm-unit plats in connection with the opening of the Government land in townships 8 and 9 south, range 1 east, were prepared and the farm unit plats in connection with the High Line, Lake Shore, and Spanish Fork units were corrected and forwarded to Washington for printing.

The public notices covering these new farm units were issued by the Secretary of the Interior on May 21, 1917.

OPERATION AND MAINTENANCE.

Storage works.—The several completed features comprising the storage works and the power canal were operated without any unusual trouble. One ditch rider and one gate tender took care of the storage and one ditch rider took care of the Spanish Fork Diversion Dam and power canal. A total of 23,995 acres were irrigated during the season of 1916. This acreage was divided into about 900 parcels or farm units, which generally represented a farmer and his family.

Of this total, approximately 15,120 acres were under the High Line unit and 8,875 under the Spanish Fork and Lake Shore units. About 35,000 acre-feet of water were turned from the Strawberry Reservoir for irrigation purposes during the year.

On January 30, 1917, the reservoir was full, with approximately 250,000 to 260,000 acre-feet of water available.

Power system.—The power plant, power canal, and transmission lines were operated practically without interruption, and power was supplied under contract to Payson, Salem, and Spanish Fork, and a few isolated places. The load on the plant has been about normal.

No additional sales of power were made during the year. It is anticipated, however, that in a short time a contract for the lighting of the city of Springville will be closed, thus adding considerably more load to the plant.

Wagon road.—Considerable expense was encountered during the fiscal year in the operation and maintenance of Diamond Fork road between West Portal flume and West Portal. The erosive action of the tunnel water undermined the wagon road at various places and caused the road to slide into the stream bed. It was necessary in several instances to rebuild the road completely, and at certain points to construct wooden cribbing to prevent undercutting.

The road from East Portal to the head of the Strawberry Valley was repaired where necessary, including the construction of a wooden bridge over the Strawberry River. This bridge has a width of 12 feet and a span of 30 feet, resting upon rock-filled crib abutments.

The operation and maintenance of Diamond Fork road from the beginning to milepost 12 was taken over by the Utah County officials and it has not been necessary to expend anything for maintenance on that portion.

GRAZING LANDS.

Grazing land in Strawberry Valley.—The 60,160 acres of grazing land in the Strawberry Valley were leased to the Heber Horse & Cattle Growers' Association, of Heber, and the Wallsburg Live Stock

Association, of Wallsburg, for a term of five years for $16,550 per annum. With the deduction of a rebate to the lessees for the land covered by the waters of the Strawberry Reservoir, the net income for the next five years will be approximately $14,500 per annum. There are at present about 1,200 head of horses and from 15,000 to 16,000 head of sheep being grazed upon this land.

Lease of Government land in Goshen Valley.—In July, 1917, approximately 5,600 acres of Government land in township 8 south, range 1 east and 1 west, withdrawn under the first form, were leased for $1,511 to the people of Goshen for haying and grazing privileges. This land is located at the south end of Utah Lake, and the entire area consists of flat marshy land, which at times is flooded with water from Utah Lake and from wasteway lateral No. 33 of the High Line unit. This land will always be used as a flood area in connection with the wasteway and should therefore not be returned to entry. For years this land has been the grazing ground of all the stray cattle in the vicinity, and at times when the lake was low a considerable quantity of swamp grass hay was cut. With the settlement of a large area of new land in the immediate vicinity of this lowland, which is being irrigated from the Strawberry Valley project, the stray cattle on this area at once became a nuisance to the new farmers; the land also assumed considerable value for grazing and haying purposes. In order to prevent the cattle from being a nuisance to the farmers in the immediate vicinity it was considered advisable to lease the land to responsible parties who would take care of it and be responsible for the cattle that were grazing there and the use that is made of it.

GOVERNMENT LAND OPENED UNDER PUBLIC NOTICE.

On May 21 the Secretary of the Interior issued a public notice covering 1,900 acres of Government land in townships 8 and 9 south, range 1 east, S. L. B. M., and on June 20 the lands were thrown open by a drawing under the direction of the land office at Salt Lake City. Out of the 37 tracts of land approximately 22 have been filed on June 30, 1917. For one tract 100 applications were received and for others from 1 to 10.

MAPLETON AND SPRINGVILLE IRRIGATION DISTRICTS.

The matter of furnishing water from the Strawberry Valley project to the Mapleton and Springville districts was reconsidered and a proposition submitted to them on March 12, 1917, calling for a subscription of 5,000 acre-feet at $47.50 per acre-foot or 4,000 acre-feet at $50 per acre-foot, by an irrigation district formed under the new State irrigation district laws.

During the month of March meetings were held at Springville and Mapleton and the formation of two irrigation districts and the amended State irrigation law were explained to the farmers, with the result that two irrigation districts are now in process of formation—one to be known as the "Mapleton Irrigation District" and the other as the "Springville Irrigation District." The water to be allotted to the districts has been determined by the State engineer. Petitions for inclusion in or exclusion from the district are at present

being received and it is thought that by August 1 the election covering the formation of the districts will be called and by August 15 the result and the amount of water desired by each district will be fully known.

At the present time it is thought that probably 4,000 acre-feet of water will be contracted for by the Mapleton district and 2,400 acre-feet by the Springville district.

GOSHEN IRRIGATION DISTRICT.

During the year several petitions and committees representing the landowners in the vicinity of Goshen and Elberta have been received, requesting that water be delivered through the High Line Canal, through an extension to Current Creek, to the lands lying in or about the towns of Goshen and Elberta. Most of these lands have already a partial water right and their particular need seems to be a source of late water. By the exchange of water in this locality, and supplementing it by a flow of stored water from the Stawberry Reservoir, it is possible to bring under cultivation 3,000 acres of now arid land and to guarantee a full water right to approximately 10,000 acres which are now suffering from want of late water in July, August, and September. Some of the finest land in the State of Utah, covered with peach orchards and fruit of all descriptions, is included, and from a public standpoint it is no doubt an excellent measure on the part of the Reclamation Service to endeavor to supply water to these lands now already under cultivation.

The formation of two irrigation districts covering these lands will be undertaken in the near future, with the hope that water may be furnished them in accordance with their needs.

SANTAQUIN PUMPING UNIT.

Negotiations were continued with the landowners north of Santaquin for the purpose of irrigating approximately 1,410 acres of land above the High Line Canal. A survey of the proposed lateral and estimates for a 10 second-foot 90-foot lift pumping plant were made in October, 1916.

A petition from the landowners covering 810 acres was received September 15 and a complete report on the matter was made under date of November 29. The proposition submitted to the landowners in their water-right applications called for $80 per acre for 2 acre-feet of water, plus $20 per acre to cover cost of construction of pumping plant, or $100 per acre for 2 acre-feet of water, payable under the 20-year reclamation extension act. The landowners took the matter under advisement about March 1 and on April 9, through their chairman, the proposition was rejected for the present at least. There is, however, a probability that the matter will again come up for reconsideration at a later date.

PRINCIPAL CROPS.

Crop report, Strawberry Valley project, Utah, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay	6,922	Ton	23,009	3.3	$19.00	$437,171	$63.10
Alfalfa seed	20	Bushel	52	2.6	9.00	468	23.40
Barley	722	do	26,305	35.0	1 25	32,881	45.54
Beans	13	do	183	14.0	4.80	880	67 70
Beets, sugar	5,298	Ton	65,201	12.4	6.50	424,207	80.06
Corn	53	Bushel	2,175	41.4	1.00	2,175	41.43
Cane	3					195	65.00
Garden	109					28,745	262.50
Hay, except alfalfa	755	Ton	2,002		4.02	8,044	10.65
Oats	1,966	Bushel	76,517	39.0	.55	42,084	21.30
Orchard, mixed	122					6,362	52 15
Pasture[1]	1,973					34,885	17.50
Potatoes	212	Bushel	25,401	119.8	2.50	63,502	299.50
Rye	28	do	722	25.8	.90	650	23.20
Wheat	6,870	do	132,209	19.3	1.80	237,886	34.63
Total cropped acreage.	25,066	Total and average				1,320,135	52.70

Areas.	Acres.	Farms.	Per cent of project.
Irrigated, no crops, or not reported. 5,656	Total irrigable area farms reported.	31,750	1,378	.....
	Total irrigated area farms reported.	30,722	1,378	.....
	Under water-right applications.			
Total irrigated acreage. 30,722	Under rental contracts			
	Total cropped area farms reported.	25,066	1,378	.....

[1] In addition, about 3,000 acres of land on lake shores were pastured without irrigation, except by seepage from higher lands.

PUBLIC NOTICES AND ORDERS.

PUBLIC NOTICE, MAY 21, 1917.

1. In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplementary thereto, and particularly the reclamation extension act of August 13, 1914 (38 Stat., 686), a public notice for the second section High Line unit of the Strawberry Valley project, Utah, is hereby issued as follows:

2. *Lands for which water will be furnished.*—Upon proper application being made therefor, water will be furnished under said project in the irrigation season of 1917, and thereafter, for the irrigable lands of the second section, High Line unit, shown on the farm-unit plats of the following townships of the Salt Lake base and meridian, to wit: T. 8 S., Rs. 1 and 2 E.; T. 9 S., Rs. 1, 2, and 3 E.; T. 10 S., R. 1 E.; which plats were approved by the Secretary of the Interior on May 21, 1917, and are on file in the office of the project manager, Reclamation Service, Provo, Utah, and the local land office at Salt Lake City, Utah.

3. *When and how to make entry for public land.*—Homestead entries for the farm units shown on said plats embracing public lands of the United States may be made beginning June 20, 1917, at 9 o'clock a. m., at the said local land office. Every person desiring to acquire

any of said public lands must execute a homestead application subject to the provisions of the reclamation law in manner required by law, which, with the required fees and commissions, accompanied by certificate of the project manager as to the filing of water-right application and payment of water-right charges as hereinafter provided, may be presented to said local land office, in person, by mail, or otherwise, within a period of five days prior to the opening, to wit: On and from June 15, 1917, to and including 9 o'clock a. m., June 20, 1917. Applications presented after said period of five days will be filed and noted in the order of their receipt. Any applications not based on a prior settlement right will be subject to valid settlement claims asserted in the manner required by law.

4. *Simultaneous filings for public lands.*—Applications reaching said local land office during said period of five days will be held and treated as simultaneously filed, and the register and receiver will dispose of them as follows:

(*a*) Where there is no conflict the application will be allowed, irrespective of whether settlement is alleged.

(*b*) In case of conflicting applications and only one of the applicants alleges prior settlement, his application will be allowed and the others rejected.

(*c*) If two or more conflicting applications, each containing allegations of prior settlement, are received, a hearing, restricted to those alleging such right, will be ordered to determine the priority of right.

(*d*) Where there are conflicting applications in which no one of the several applicants claims prior settlement the register and receiver will write on cards the names of the several applicants, and each of these cards will be placed in an envelope upon which there is no distinctive or identifying mark, and at 2 o'clock p. m., on the date of opening to entry, if practicable (if not, at the same hour one day later), after all the envelopes containing the names of the several applicants shall have been thoroughly mixed in the presence of such persons as may desire to be present, they will be drawn and numbered in order. The cards as drawn and numbered will be securely fastened to the applications of the respective persons, and the applications will be allowed in such order. Applications conflicting in whole with those previously allowed will be rejected in the usual manner.

5. *Failure of applicant to obtain public land applied for.*—Where any applicant fails to obtain land applied for by him he will be permitted to elect whether he will amend his application to embrace other lands not affected by pending applications and otherwise subject thereto when such amended application is presented, or withdraw his original application without prejudice. In the event of such withdrawal the fees and commissions will be returned by the receiver and the water-right charges deposited will be returned by the project manager, upon surrender of the certificate of filing issued by the project manager.

6. *Warning against unlawful settlement upon public land.*—No person will be permitted to gain or exercise any right whatever under any settlement or occupation of any of said public lands, begun at or prior to 9 a. m., June 20, 1917: *Provided, however,* That this

shall not affect any valid existing right obtained by settlement or entry while the land was subject thereto.

7. *Limit of area for which water right may be secured.*—The limit of area per entry representing the acreage which, in the opinion of the Secretary of the Interior, may be reasonably required for the support of a family upon such lands, is fixed as shown upon the plats for the several farm units. The maximum limit of area for which water-right application may be made for lands in private ownership shall be 160 acres of irrigable land for each landowner.

8. *Application for water right.*—All water-right applications, whether for public or private lands, must be made to the project manager, United States Reclamation Service, Provo, Utah, upon forms provided for that purpose, and may be made on and after the date hereof. In the case of public lands, each water-right application must be for a specified farm unit, and more than one person may make such application for the same farm unit. A certificate of filing will be issued each applicant by the project manager. Filing of water-right applications and issuance of certificate give no preference right to entry on public lands. Only when the project manager is notified by the local land office that an entry has been allowed will acceptance of the water-right application be indorsed thereon. Whereupon all other water-right applications affecting the farm unit in question, with payments made, will be returned to the respective applicants, upon surrender by them of the certificates of filing issued by the project manager.

9. *Classes of charges for water rights.*—The water-right charges are of two kinds, to wit: (1) A charge against each irrigable acre to cover cost of construction of the irrigation system, termed the "construction charge," and (2) an annual charge against each irrigable acre to cover cost of operation and maintenance of the system, termed the "operation and maintenance charge."

10. *Construction charge.*—The construction charge shall be $80 per acre of irrigable land, payable as follows:

(*a*) For lands that were entered prior to August 13, 1914, subject to the reclamation law, or prior to that date were subjected by contract, trust deed, or otherwise to the provisions of the reclamation law, said construction charge shall be paid in 10 equal annual installments, the first of which shall be paid at the time of filing water-right application, and subsequent installments shall be due and payable December 1 of each year thereafter: *Provided, however,* That if water-right application subject to the provisions of said reclamation extension act, or an acceptance of the provisions of same in accordance with section 14 thereof, be filed within six months from the date of this notice, said construction charge shall be payable in 20 annual installments, the first of which shall become due and payable on December 1 following the date of water-right application, and subsequent installments on December 1 of each year thereafter, in which event the first four installments shall each be 2 per cent, the next two installments shall each be 4 per cent, and the next 14 each 6 per cent of the total construction charge.

(*b*) For the remaining lands, an initial payment of 5 per cent of the construction charge shall be made at the time of filing water-right application, and the remainder of the construction charge shall be due and payable in 15 annual installments, the first five of which

shall each be 5 per cent and the remainder each 7 per cent of the total construction charge. The first of said 15 annual installments shall become due and payable December 1 of the fifth calendar year after the initial installment, and subsequent installments shall become due and payable on December 1 of each calendar year thereafter.

11. *Increased construction charges in certain cases.*—In all cases where water-right application for lands in private ownership or for lands under entry not subject to the reclamation law, shall not be made within one year from the date of this notice, the construction charge for such lands shall be increased 5 per cent each year until such application is made and an initial installment is paid.

12. *Advance payment of construction charge permissible.*—Any water-right applicant may, at his option, pay in advance the whole or any part of the construction charge owing by him within any shorter period than that prescribed by this notice.

13. *Operation and maintenance charge.*—The operation and maintenance charge for the High Line unit for the irrigation season of 1917 and thereafter until further notice shall be 80 cents per acre of irrigable land whether water is used thereon or not, which will entitle the water user to 2 acre-feet of water per irrigable acre. All such charges will be payable on December 1 of each year for the preceding irrigation season, but where water-right application is made for public land entered under the reclamation law after June 15 in any year, or where water-right application is made for land in private ownership after August 1 in any year no operation and maintenance charge will be made for water delivered during the remainder of the irrigation season in which the water-right application is made.

14. *Schedule of water delivery for High Line unit.*—During the irrigation season of 1917 and thereafter until further notice water will be delivered to all lands of the High Line unit, Strawberry Valley project, Utah, under public notice in accordance with the following schedule: In May, 18 per cent of the total amount called for by the water-right application, in as near a uniform flow as practicable. The remainder of the season's supply to be delivered as demanded, but not to exceed 27½ per cent of the total amount in any one month, in as near a uniform flow as practicable, during the remainder of the irrigation season, which is from May 1 to September 30.

15. *Place and method of payment of water-right charges.*—All water-right charges must be paid at the office of the United States Reclamation Service, Provo, Utah, in cash, or by New York draft, or money order, payable to the special fiscal agent, United States Reclamation Service.

FRANKLIN K. LANE,
Secretary of the Interior.

PUBLIC NOTICE, MAY 29, 1917.

1. In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplementary thereto, and particularly of the reclamation extension act of August 13, 1914 (38 Stat., 686), public notice for the second section, Spanish Fork and Lake Shore units of the Strawberry Valley project, Utah, is hereby issued as follows:

2. *Lands for which water will be furnished.*—Upon proper application being made therefor, water will be furnished upon said project in the irrigation season of 1917 and thereafter for the irrigable lands of said second section, Spanish Fork and Lake Shore units, shown on the farm-unit plats of the following townships of the Salt Lake Base and Meridian, to wit: T. 7 S., R. 2 E.; T. 8 S., Rs. 1 and 2 E.; T. 9 S., Rs. 1, 2, and 3 E. The plats of T. 8 S., Rs. 1 and 2 E., and T. 9 S., Rs. 1, 2, and 3 E., were approved by the Secretary of the Interior on May 21, 1917, and the plat of T. 7 S., R. 2 E., was so approved May 29, 1917. All of said plats are on file in the office of the project manager, United States Reclamation Service, Provo, Utah, and the local land office at Salt Lake City, Utah.

3. *Limit of area for which water right may be secured.*—The limit of area per entry representing the acreage which, in the opinion of the Secretary of the Interior, may be reasonably required for the support of a family upon such lands is fixed as shown upon the plats for the several farm units. The maximum limit of area for which water-right application may be made for lands in private ownership shall be 160 acres of irrigable land for each landowner.

4. *Application for water right.*—All water-right applications must be made to the project manager, United States Reclamation Service, Provo, Utah, upon forms provided for that purpose, and may be made on and after the date hereof. Such applications may be made for one-half acre-foot of water per acre, 1 acre-foot per acre, 1½ acre-feet per acre, or 2 acre-feet per acre, as the applicant may desire.

5. *Classes of charges for water rights.*—The water-right charges are of two kinds, to wit: (1) A charge against each irrigable acre to cover cost of construction of the irrigation system, termed the construction charge; and (2) an annual charge against each irrigable acre to cover cost of operation and maintenance of the system, termed the operation and maintenance charge.

6. *Construction charges.*—The construction charges for said lands are of four kinds, to wit: (1) $22.50 per irrigable acre when application is made for one-half of 1 acre-foot of water per irrigable acre; (2) $45 per irrigable acre when application is made for 1 acre-foot of water per irrigable acre; (3) $67.50 per irrigable acre when application is made for 1½ acre-feet of water per irrigable acre; and (4) $90 per irrigable acre when application is made for 2 acre-feet of water per irrigable acre. Such charges are in each case payable as follows:

(*a*) For lands that were entered prior to August 13, 1914, subject to the reclamation law, or prior to that date, were subjected by contract, trust deed, or otherwise to the provisions of the reclamation law, said construction charge shall be paid in 10 equal annual installments, the first of which shall be paid at the time of filing water-right application, and subsequent installments shall be due and payable December 1 of each year thereafter: *Provided, however,* That if water-right application subject to the provisions of said reclamation extension act, or an acceptance of the provisions of same in accordance with section 14 thereof, be filed within six months from the date of this notice, said construction charge shall be paid in 20 annual installments, the first of which shall become due and payable on December 1 following the date of water-right application, and subsequent installments on December 1 of each year thereafter, in which event the first four installments shall each be 2 per cent, the next two installments

shall each be 4 per cent, and the next 14 each 6 per cent of the total construction charge.

(*b*) For the remaining lands an initial payment of 5 per cent of the construction charge shall be made at the time of filing water-right application, and the remainder of the construction charge shall be paid in 15 annual installments, the first 5 of which shall each be 5 per cent and the remainder each 7 per cent of the total construction charge. The first of said 15 annual installments shall become due and payable December 1 of the fifth calendar year after the initial installment, and subsequent installments shall become due and payable on December 1 of each calendar year thereafter.

7. *Increased construction charge in certain cases.*—In all cases where water-right application for lands in private ownership, or for lands under entries not subject to the reclamation law, shall not be made within one year from the date of this notice, the construction charge for such lands shall be increased 5 per cent each year until such application is made and an initial installment is paid.

8. *Advance payment of construction charge permissible.*—Any water-right applicant may, at his option, pay in advance the whole or any part of the construction charge owing by him within any shorter period than that prescribed by this notice.

9. *Operation and maintenance charge.*—The minimum operation and maintenance charge for the irrigation season of 1917, and thereafter until further notice, shall be 40 cents per acre of irrigable land, whether water is used thereon or not, which will entitle the water user to not more than 1 acre-foot of water per irrigable acre, and in no event more than the amount per acre specified in the water-right application. Should water be needed in excess of 1 acre-foot per irrigable acre and the water-right application provides for more than that amount, it will be furnished at the rate of 40 cents per acre-foot. All such charges will be payable on December 1 of each year for the preceding irrigation season, but where water-right application is made for public land entered under the reclamation law after June 15 in any year, or where water-right application is made for land in private ownership after August 1 in any year, no operation and maintenance charge will be made for water delivered during the remainder of the irrigation season in which the water-right application is made.

10. *Place and method of payment of water-right charges.*—All water-right charges must be paid at the office of the United States Reclamation Service at Provo, Utah, in cash or by New York draft or money order payable to the special fiscal agent, United States Reclamation Service.

FRANKLIN K. LANE,
Secretary of the Interior.

FINANCIAL STATEMENT.

[Financial statement in detail showing assets, liabilities, reserves, and capital given in Appendix, p. 520.]

Feature costs of Strawberry Valley project to June 30, 1917.

Features.	Cost.	
	Fiscal year, 1917.	Total to June 30, 1917.
Examination and surveys:		
Reconnoissance	$159.77	$5,421.29
Trial lines	72.78	116.77
Topography	419.41	10,020.60
Water rights	146.16	12,184.82
Experimental investigation	18.84	1,539.80
Subdivisions	321.62	321.62
Cross section	12.16	12.16
Location	6.05	6.05
Hydrometry	2,051.48	15,684.29
	3,208.27	45,307.40
Storage system:		
Strawberry Dam	780.65	160,591.93
Wasteway	6,140.01	57,019.13
Wasteway bridge		8,980.84
Sluicing tunnel		47,889.08
Indian Creek dike		119,249.92
Indian Creek and Trail Hollow Canals		70,764.66
Indian Creek and Trail Hollow intake and spillway		21,845.95
Indian Creek and Trail Hollow terminal drop and chute		21,734.77
Controlling works and intake		99,728.11
Strawberry Tunnel	[1] 4,307.63	1,076,349.96
Strawberry Tunnel outlet weir		10,528.46
West portal measuring flume	300.34	7,123.72
East portal permanent camp		8,422.31
Submerged lands		10,000.00
Used equipment	[1] 5,129.82	19,029.61
Wagon roads	[1] 48,862.30	
Grazing lands	[1] 61,085.65	
	[1] 112,164.40	1,739,258.45
Canal system:		
Main distribution and power canal—		
Spanish Fork reservoir and river improvement		10,375.49
Spanish Fork diversion dam		39,695.90
Spanish Fork River bridge at diversion dam		2,524.60
Spanish Fork diversion dam camp		6,812.71
Canal excavation		143,638.31
Canal concrete lining		42,659.60
Canal aqueduct		13,052.09
Culvert at station No. 139		2,584.20
Concrete arch covering	14,678.50	31,250.53
Tunnel No. 1		27,606.23
Tunnel No. 2		21,852.22
Minor structure, timber		8,263.33
Minor structure, concrete	1,634.76	1,634.76
Wasteway, sand box, and inlet chamber		24,750.02
	16,313.26	376,699.99
High Line Canal—		
Examination and survey		38,835.41
Headworks		4,364.36
Canal excavation		148,476.09
Concrete canal lining	3,833.83	108,465.67
Tunnel No. 1, concrete		8,824.12
Peteetneet siphon		7,915.83
Inlet dam, Peteetneet		1,955.66
Bridge, State road, concrete		2,069.93
Siphon, San Pedro Railroad		3,946.00
Notch drop and chute, Goshen Pass		561.80
Siphon, Denver & Rio Grande Railroad connection, Goshen Pass	890.33	1,824.70
Spillway head of lateral No. 33		1,510.60
Flume No. 9, concrete		44,706.18
Flume No. 8, concrete		5,361.51
Flume, double-barrel, covered, concrete		13,889.72
Turnouts with checks		3,778.34
Minor structures, concrete		4,794.22
Minor structures, timber		19,120.28
Turnout No. 9 and bridge No. 6		1,687.67
Turnout No. 30 and measuring device		4,137.73

[1] Deduct.

Feature costs of Strawberry Valley project to June 30, 1917—Continued.

Features.	Cost.	
	Fiscal year, 1917.	Total to June 30, 1917.
Canal system—Continued.		
High Line Canal—Continued.		
Minor structures, pipe		$4,992.58
Minor structures, wooden		1,334.30
Minor structures, metal		3,007.25
	$4,724.16	435,559.95
	21,037.42	812,259.94
Lateral systems:		
Divisions 5, 6, 7, 8, 9—		
Examination and surveys	12,554.41	37,262.38
Lateral excavation		32,757.71
Lateral concrete lining	[1] 6,799.16	185,788.96
Metal flume, 3 feet 2½ inches		2,180.87
Metal flume, 3 feet 9½ inches		1,088.47
Siphon, 30 inches, steel, lateral No. 30		3,899.07
Siphon, 36 inches, C. I., lateral No. 30		811.77
Siphon, State road and turnout 20		908.58
Siphon, San Pedro Railroad, 24 inches, C.I. and vitrified pipe, lateral 28		4,164.85
Siphon, Denver & Rio Grande Railroad and turnout No. 20, P. & Q., 36 inches, C. I. pipe		1,113.74
Siphon, San Pedro Railroad lateral 20R, 30 inches, C. I. pipe		816.76
Siphon, lateral 27, 18 inches, vitrified pipe		1,545.77
Culvert, State road and turnout 20, C. D		1,199.48
Minor structure, concrete		47,213.05
Minor structure, timber		2,766.63
Minor structure, pipe		20,666.00
Minor structure, metal		1,634.41
	5,755.25	345,818.50
Division 10—		
Lateral excavation	35,289.93	35,289.93
Lateral concrete canal lining	104,652.31	104,652.31
Metal flume No. 1, 3 feet 2½ inches	1,781.02	1,781.02
Metal flume No. 3, 3 feet 2½ inches	748.67	748.67
Metal flume No. 4, 5 feet 8¾ inches	1,093.02	1,093.02
Metal flume No. 5, 5 feet 8¾ inches	859.57	859.57
Metal flume No. 6, 5 feet 8¾ inches	939.77	939.77
Metal flume No. 7, 4 feet 5½ inches	3,400.97	3,400.97
Metal flume No. 8, 4 feet 5½ inches	1,652.98	1,652.98
Metal flume No. 9, 4 feet 5½ inches	15,556.77	15,556.77
Metal flume No. 10, 4 feet 5½ inches	660.28	660.28
Metal flume No. 11, 4 feet 5½ inches	879.99	879.99
Metal flume No. 12, 3 feet 2½ inches	825.62	825.62
Metal flume No. 13, 1 foot 11 inches	1,614.62	1,614.62
Measuring box, concrete for turnout 32–EF	708.26	708.26
Measuring box, concrete for turnout 32–CD	793.75	793.75
Siphon, 36 inches, steel, lateral 31	6,780.92	6,780.92
Pipe line, double-barrel, vitrified pipe, lateral 31	5,264.83	5,264.83
Culvert, 24 inches, vitrified pipe, lateral 31	1,345.65	1,345.65
Culvert, 24 inches, vitrified pipe, lateral 31	2,594.75	2,594.75
Culvert, State road and turnout 31–E2	1,218.22	1,218.22
Minor structures, concrete	17,641.59	17,641.59
Minor structure, timber	2,196.60	2,196.60
Minor structure, pipe	9488.84	9,488.84
	217,988.93	217,988.93
	223,744.18	563,807.43
Power system:		
Concrete arch, beam and slab covering	105.98	105.98
Hydroelectric power plant		36,279.74
Penstock	8,241.13	8,241.13
Spanish fork transmission line		3,556.85
Payson transmission line		6,810.27
Power-house camp	2,436.72	13,745.69
	10,783.83	68,739.66
Farm units	4,822.05	9,025.68
Permanent improvements: Wagon roads and Provo office	48,877.60	54,137.60
Strawberry Valley grazing lands	61,085.65	61,085.65
	109,963.25	115,223.25
Telephone system: Lines, Spanish Fork to Strawberry Dam	[1] 632.42	14,051.19
Operation and maintenance during construction	[1] 73,527.02	12,511.90
Plant accounts	4,344.49	4,344.49
Gross construction cost to June 30, 1917	191,579.65	3,384,529.39

[1] Deduct.

Feature costs of Strawberry Valley project to June 30, 1917—Continued.

Features.	Cost.	
	Fiscal year, 1917.	Total to June 30, 1917.
Less revenues earned during construction period:		
Rental of buildings		$5,675.80
Net grazing revenues		45,664.56
Net power light revenues		[1] 25,145.19
Rentals of irrigation water		400.00
Rentals of telephones and telephone tolls		1,318.82
Contractors' freight refunds		586.36
Forfeitures defaulting bidders and contractors		270.00
Profit, mess-house operations		5,026.11
Profit, mercantile store operations		9,249.70
Profit on hospital operations		[1] 3,271.96
		39,774.20
Net cost of construction of project to June 30, 1917		3,344,755.19

[1] Deduct.

Statement of costs by calendar years, Strawberry Valley project.

Year ending Dec. 31—	Construction.	Operation and maintenance.			Total cost.
		During construction.	Under public notice.	Total.	
1907	$358,107.73				$358,107.73
1908	259,775.33				259,775.33
1909	200,684.30				200,684.30
1910	234,577.92				234,577.92
1911	538,013.86				538,013.86
1912	772,509.84				772,509.84
1913	[1] 1,870.02				[1] 1,870.02
1914	5,733.63	$69,420.68		$69,420.68	75,154.31
1915	746,220.44	3,779.23	$8,323.31	12,102.54	758,322.98
1916	194,074.66	[1] 60,688.01	18,037.06	[1] 42,650.95	151,423.71
January to June 30, 1917	64,189.80		10,144.70	10,144.70	74,334.50
Total	3,372,017.49	12,511.90	36,505.07	49,016.97	3,421,034.46

[1] Deduct.

NOTE—The project was opened under public notice in 1915 and the appropriate costs for operation and maintenance under public notice were opened up and taken out of operation and maintenance during construction.

Statement of costs by fiscal years, Strawberry Valley project.

Year ending June 30—	Construction.	Operation and maintenance.			Total cost.
		During construction.	Under public notice.	Total.	
1906	$45,409.35				$45,409.35
1907	88,401.94				88,401.94
1908	192,288.51				192,288.51
1909	287,815.86				287,815.86
1910	193,766.85				193,766.85
1911	306,110.46				306,110.46
1912	691,590.78				691,590.78
1913	381,828.93				381,828.93
1914	52,519.18	$50,693.04		$50,693.04	103,212.22
1915	389,975.33	28,165.77		28,165.77	418,141.10
1916	377,203.63	7,180.11		7,180.11	384,383.74
1917	265,106.67	[1] 73,527.02	$36,505.07	[1] 37,021.95	228,084.72
Total	3,372,017.49	12,511.90	36,505.07	49,016.97	3,421,034.46

[1] Deduct.

NOTE.—The project was opened under public notice in 1915 and appropriate cost has been taken out of operation and maintenance during construction and debited to operation and maintenance under public notice.

Estimated cost of contemplated work, Strawberry Valley project, during fiscal year 1918.

Features.	Estimated cost during fiscal year 1918. Subfeature.	Principal feature.
Examination and surveys:		
Reconnoissance	$200.00	
Trial lines	1,500.00	
Topography	500.00	
Estimates	500.00	
Camp maintenance	50.00	
Superintendence and accounts	50.00	
General expense	200.00	
		$3,000.00
Storage works: Clay blanket, Strawberry Dam		1,500.00
Canal system: Flume, double-barreled concrete (replacing wooden structure)		13,400.00
Lateral system:		
Mapleton lateral—		
Headworks, siphon	4,155.00	
Pipe Line 42 inch steel	7,797.00	
Bridge, Spanish Fork River	2,930.00	
Bridge over East Bench Canal	1,045.00	
36 inch C. I. siphon	950.00	
Siphon, Denver & Rio Grande Railroad	6,183.00	
Culvert No. 1	2,515.00	
Culvert No. 2	3,247.00	
Lateral excavation	33,350.00	
Lateral concrete lining	10,825.00	
Minor structures	15,000.00	
Contingencies	10,000.00	
Road crossing and culvert	2,803.00	100,000.00
Power system:		
Substation, Springville, Utah	6,000.00	
Transmission line, Springville, Utah	7,000.00	13,000.00
Farm unit surveys: Plats, Mapleton unit		3,000.00
Operation and maintenance under public notice:		
Storage Works—		
Strawberry Dam	4,500.00	
Indian Creek Dike	800.00	
Indian Creek feeder canal	700.00	
Trail Hollow feeder canal	600.00	
Strawberry tunnel	2,000.00	
West portal measuring flume	3,000.00	
Telephone system	1,000.00	
Carriage System—		
Main distributary and power canal	2,500.00	
High Line Canal	400.00	
High Line laterals	100.00	
Hydrometry	3,500.00	
Roads	2,000.00	
Bridges on roads	1,000.00	
Power system—		
Central station	8,000.00	
Transmission lines	400.00	
Power canal	1,200.00	
Grazing lands—		
Operation and maintenance	800.00	
Refund to leasers	2,500.00	
		35,000.00
Stores and other operations		1,100.00
Total		170,000.00

WASHINGTON, OKANOGAN PROJECT.

CALVIN CASTEEL, project manager, Okanogan, Wash.

LOCATION.

County: Okanogan.
Townships: 33 to 34 N., Rs. 25 to 27 E., Willamette meridian.
Railroad: Great Northern (branch line).
Railroad stations and estimated population, January 1, 1917, Okanogan, 1,000; Omak, 400; Riverside, 250.

WATER SUPPLY.

Source of water supply: Salmon Creek.
Area of drainage basin: 121 square miles above Conconully Dam.
Annual run-off in acre-feet of Salmon Creek at Jones's ranch, near Okanogan (140 square miles), 1903 to 1916: Maximum, 56,500; minimum, 17,350; mean, 34,084.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service is prepared to supply water, season of 1917: 10,099 acres.
Area under water-right applications, rental, and vested water-right contracts to June 30, 1917: 10,099 acres.
Length of irrigating season: May 1 to September 1—123 days.
Average elevation of irrigable area: 1,000 feet above sea level.
Rainfall on irrigable area: At Omak, Wash., 7-year average, 12.51 inches; 1916, 12.56 inches. At Conconully, Wash., at base of Salmon River watershed, 17-year average, 16.29 inches; 1916, 12.92 inches.
Range of temperature on irrigable area: −10° to 105° F.
Character of soil of irrigable area: Volcanic ash and gravel on upper benches and sand and gravel on lowlands along Okanogan River.
Principal products: Fruit, hay, grain, and vegetables.
Principal market: States east.

LANDS OPENED FOR IRRIGATION.

Dates of public notices and orders: November 12, 1908; March 12, 1910; April 8, 1910; February 23, 1911; March 28, 1911; April 29, 1912; July 6, 1912; March 10, 1913; June 16, 1913; January 16 and September 24, 1914; March 20, May 15, and July 28, 1915; March 16, 1916; April 18, 1917.
Location of lands opened: Tps. 33 and 34 N., Rs. 25 to 27 E., Willamette meridian.
Present status of irrigable area opened: Entered subject to the reclamation act, 1,234 acres; opened to entry, none; private lands, 8,865 acres.
Limit of area of farm units: Public, 40 acres; private, 40 acres.
Duty of water: 2½ acre-feet per acre per annum at the farm.
Building charge per acre of irrigable land: $95, subject to credit of $16 per acre in certain cases where landowners constructed and operate and maintain their own ditches.
Annual operation and maintenance charge: Effective for irrigation year 1917, the annual operation and maintenance charge was announced at a minimum of $1.50 per acre, payable whether water was used or not, which would entitle land to a delivery of 1, 1½, or 2 acre-feet per acre, depending upon classification of the soil, additional water being furnished at the rate of 50 cents for the first acre-foot and 75 cents per acre-foot for all additional amounts.

CHRONOLOGICAL SUMMARY.

Reconnoissance and preliminary surveys begun in 1903.
Construction recommended by board of engineers, October 9, 1905.
Construction authorized by Secretary, December 2, 1905.
First irrigation by Reclamation Service, season of 1908.
Conconully Dam completed, August, 1910.
Water surface in Conconully Reservoir reached spillway crest for first time May 19, 1914.

Power and pumping system completed, 1916.
Concrete lining of canals and extension of distribution system completed, 1917.
Third unit opened, 1917.
Project practically completed, October, 1910.

IRRIGATION PLAN.

The irrigation plan of the Okanogan project provides for the storage of water in Salmon Lake and in Conconully Reservoir, controlled by Conconully Dam on Salmon Creek, about 2 miles below Conconully, Wash.; the control of Salmon Lake Reservoir by a short inlet canal from Salmon Creek and concrete outlet works; the control of Conconully Reservoir by means of an outlet tunnel discharging into Salmon Creek below the storage dam; the diversion of water from Salmon Creek by a dam about 12 miles below the reservoir into a canal system watering lands in the valley of Okanogan River between Riverside and Okanogan, Wash.; and the construction and operation of a pumping plant to be used to supplement the gravity supply of the project by pumping from the Okanogan River to approximately 1,050 acres of land on the sandy portion of the project known as Robinson Flat, where the duty of water is less than on the heavier soils. The power for the pumping is generated by two power plants constructed at drops Nos. 1 and 2 on the upper main lateral and transmitted to the pumping station near the town of Omak by 5⅓ miles of transmission line. This pumping plant is to be operated only during years when the gravity supply of water will not be sufficient.

The following features of the project—consisting of the inlet canal and outlet works to Salmon Lake; Conconully hydraulic filled dam, spillway, and outlet works; the diversion weir and distribution system—are completed and have been in use during irrigation seasons since 1910.

SUMMARY OF GENERAL DATA FOR OKANOGAN PROJECT TO END OF FISCAL YEAR 1917.

Areas:			
Irrigable acreage when project is complete			10,099
Private land			10,099
Acreage service could have supplied season of 1916			10,099
Estimated acreage service can supply July 1, 1918			10,099
Acreage actually irrigated season of 1916			7,850
Acreage cropped under irrigation season of 1916			5,242
Crops:			
Value of irrigated crops season of 1916			$328,385
Value of irrigated crops per acre cropped			$62.64
Finances:			
Gross construction cost to end of fiscal year			$843,242.79
Per cent complete at end of fiscal year			99
Appropriated for fiscal year 1918, total			$32,000
Allotment for construction fiscal year 1918			$7,500
Estimated per cent complete June 30, 1918			.100
Estimated per cent complete June 30, 1919			100
Announced construction charges per acre			$95
Appropriation fiscal year 1917			[1] $71,709.68
Expenditures during fiscal year, chargeable to 1917 appropriation—			
Disbursements	$28,177.29		
Transfers	2,136.37		
		30,313.66	
Registered liabilities chargeable to 1917 appropriation		3,191.37	
Contract obligations wholly covered by 1917 appropriation		4,875.00	
			38,380.03
Unencumbered balance July 1, 1917			33,329.65

[1] Includes refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

Repayments:	
Construction charges—	
Accrued to end of fiscal year	$16,670.38
Collected to end of fiscal year	16,647.98
Uncollected at end of fiscal year	22.40
Operation and maintenance charges (public notice)—	
Accrued to end of fiscal year	37,167.23
Collected to end of fiscal year	37,050.14
Uncollected at end of fiscal year	117.09
Water-rental charges—	
Accrued to end of fiscal year	105,871.02
Collected to end of fiscal year	92,676.18
Uncollected at end of fiscal year	13,194.84
Power earnings—	
Accrued to end of fiscal year	564.39
Uncollected at end of fiscal year	564.39

CONSTRUCTION DURING FISCAL YEAR.

Salmon Lake improvement.—The improvement work at Salmon Lake, which had been contemplated for several years, was completed during August and September, 1916. The work consisted in raising the outlet structure, requiring 18 cubic yards of concrete; the building of an earthen dam across the lower end of the lake, containing 3,750 cubic yards of earth; and the raising of the county road, skirting the lake on the north side for a distance of 2,540 feet, involving the moving of 3,000 cubic yards of base and surface material. The earthern dam is 880 feet long and enables the raising of the water surface in the lake a distance of 3 feet, thus increasing the storage capacity 600 acre-feet.

Canal lining.—This work which has been in progress each year since 1912, between irrigation seasons, was continued and completed during the fiscal year 1917. The work consisted of placing a plaster lining of concrete 1½ inches thick upon a specially prepared foundation following the natural slope of the canal banks. During the year 32,795 linear feet of canals were lined, requiring 1,188 cubic yards of concrete, which covered 29,458 square yards of canal surface. Up to the end of the fiscal year approximately 37 miles of canal had been lined, requiring 9,262 cubic yards of concrete covering to 222,276 square yards.

Improvement of South Side Canal.—This work involved the improvement of a small private canal diverting on the south side of Salmon Creek and watering some 462 acres of land in the third unit of the project. The landowners under this canal petitioned the United States to take the system over and improve and operate it for the delivery of water to each farm in the same manner as was done within the first and second units of the project. The irrigation system was transferred to the United States free of cost, the landowners relinquishing the credit of $16 per acre on the construction charge, which had been previously granted them on account of the construction of their own irrigation system, and the owners of the vested water-right lands, amounting to 155 acres, agreed to repay their propor-

tionate share of cost of the improvement work, which was limited to $20 per acre. The work was done during the months of May and June, 1917, involving the concrete lining of 13,550 linear feet of canals, requiring 388 cubic yards of concrete, the placing of 6,124 feet of black iron pipe ranging from 4 to 10 inches in diameter, and the installing of 51 minor wooden structures. These lands were included in the other third unit lands which were opened for water-right application by public notice dated April 18, 1917, except that the public notice announcing the charge against the old water-right lands for the improvement work has not yet been issued.

Extension of distribution system.—The construction of open earthern ditches, iron pipe lines, and appurtenant structures for the delivery of water to individual farms as new tracts were brought under irrigation was continued. During the year 7,916 linear feet of black iron pipe, ranging in size from 4 to 12 inches, were laid and 23 minor wooden structures, consisting of pipe outlets, measuring devices, drains, etc., were installed. This pipe was manufactured on the project from iron sheets purchased from the rolling mills; the completed pipe was dipped in two coats of asphaltum. At the end of the fiscal year this work had practically been completed and a total of approximately 27 miles of this class of pipe had been laid.

Power and pumping plants.—The only work done on this feature during the year was the testing of the apparatus. The first test, which was made in August, 1916, developed the fact that power plant No. 2 fell below the rated capacity as guaranteed by the manufacturers of the hydraulic apparatus. This test was not entirely satisfactory for the reason that a sufficient amount of water was not available for developing the full power of the turbine. A final test was made during June, 1917, when a sufficient flow of water was available in the canals and more satisfactory results were obtained. At the close of the fiscal year one of the power plants was being operated for the sale of commercial power under contract with the Okanogan Valley Power Co.

OPERATION AND MAINTENANCE.

The run-off of Salmon Creek during 1916 was next to the largest during the period, from 1903 to 1916, inclusive, that records of flow of this stream have been kept, amounting to 48,635 acre-feet. The maximum run-off during the period named was 56,500 acre-feet, minimum 17,350, and mean 34,084. Owing to the fact that this run-off practically all occurred during the months of April, May, and June, it was impossible to impound all the water in the reservoirs, and consequently 22,570 acre-feet ran to waste into the Okanogan River and over the various spillways on the lateral system. At the end of the year 7,838 acre-feet remained in storage, an increase of 1,738 acre-feet over the amount carried over the previous year. The irrigation season of 1916 began with the delivery of water on May 4 and it continued until September 14. Owing to continued hot and dry weather, the water was turned on again and ran from September 19 to 26. The usual fall rains did not materialize, and on account of the insistent demand water was again turned on on October 14 and continued to run until November 11, in order that the orchards of the project might not go into the

winter in a dry condition. The service was prepared to deliver water to 10,099 acres, of which 7,850 acres, or 77.7 per cent, of the total irrigable area was actually irrigated. Water was delivered during the season to 458 farms, containing an aggregate of 8,450 acres of irrigable land, or 83.6 per cent of the area of the project.

The growing season as a whole was favorable, being characterized by a cold backward spring and an unusual amount of precipitation during the months of June and July, and very hot, dry weather during the latter part of the summer and fall. The precipitation for June and July amounted to about 5 inches, which is very unusual for this locality. The rainfall for July all occurred very early in the month and from this time on until December the total precipitation was only about 1 inch, making one of the driest falls on record. Owing to the copious rains in the early summer no hardships resulted from this drought, as the grains and other annual crops had largely been matured before it commenced. One of the greatest inconveniences was found in hauling the fruit crop to the warehouses at the railroad stations, as the roads became very dry and were, in places, almost impassable on account of deep ruts and chuck holes.

Classification of lands.—During the season of 1916 the lands were classified for the use of water as in 1915, being designated as classes "A," "B," and "C," and entitled to delivery of 1, 1½, and 2 acre-feet, respectively, for the minimum rental charge of $1.75 per acre, with an additional charge of 50 cents per acre for all water delivered in excess of these quantities. This classification of soil and graduation of charges gave general satisfaction among the water users and provided ample revenue for the operation of the project.

Operation of system.—The entire distribution system was operated without interruption from the date water was first delivered on May 4 until September 14, except for two days, on the 4th and 5th of July, when on account of a heavy rain on July 2 water service was temporarily suspended. The system operated included 24 miles of iron pipe lines, 30 miles of concrete lined canals and 21 miles of open-earth ditches, together with the attendant structures, consisting of drops, checks, take-outs, measuring devices, etc., about 2,000 in number. There were diverted from Salmon Creek, for irrigation, 25,947 acre-feet of water by the various canals and private ditches comprising the distribution system. Of this quantity 19,615 acre-feet were actually delivered to the farms, or 2.50 acre-feet per acre irrigated. The seepage and evaporation losses in the distribution system amounted to 14.93 per cent of the water diverted, which was 5.3 per cent less than for the irrigating season of 1915. This saving in water was due partly to the settling and silting of the canal banks, but principally to the concrete lining placed during the fall of 1915 and spring of 1916. The total area irrigated was 7,850 acres, of which 6,550 acres were located under the canals of the project distribution system. This area used 2.52 acre-feet per acre. The remaining area irrigated, of 1,300 acres, is situated under the various private ditches diverting directly from Salmon Creek, but incorporated as a part of the project. At the close of the irrigation season 7,069 acre-feet remained in the reservoirs, which was about 50 per cent in excess of the holdover storage of the previous year. The system was operated during the year at a cost of $6,607.89,

which is equivalent to 65 cents per acre irrigable and 84 cents per acre irrigated. The cost of maintenance work was $8,168.25, or 81 cents per acre of irrigable land and $1.04 per acre irrigated. The total cost was $14,776.14, or $1.46 per acre of irrigable land and $1.88 per acre actually irrigated. The operation and maintenance estimate for the year was $15,000, or $1.66 per acre.

As during previous years water deliveries were made on the rotation system, the period of rotation being seven days. This method of delivery has been found to be most satisfactory for both the water users and the operating department. It tends to a saving in seepage and evaporation losses, as in the small laterals where this loss is the greatest the water is run only one-half of the time. The operating cost is also reduced on account of the necessity of patrolling these laterals only every alternate week. From the standpoint of the irrigator this system is also economical, in that he is irrigating only half the time and has ample time for cultivating and other farm work during the off or dry period. By having the periods of seven days each, the changes are always made on the same day of the week, and the irrigator, therefore, always knows what day his water is to be turned on or off. For the sandier lands of the lower benches it is also found that a seven-day period is the maximum time that the water can be shut off without detriment to the crops. In certain places where the land is especially sandy and during excessively hot dry weather, it has been found necessary at times, in order to avoid actual damage to crops, to deliver additional water either during the period or outside of the period, but this is seldom necessary where proper methods are used in irrigating. This practice is discouraged as much as possible and the tendency is constantly toward refusal to deliver water outside of the regular periods.

Maintenance work during the season was unusually heavy on account of the large amount of sand and silt which had to be removed from the canals before the irrigating season.

The maintenance organization consisted of two crews of from three to four men each under a subforeman, with a team to each crew for transportation from place to place on the project where work was being done and for hauling such material as was used in the work. Toward the latter end of the season this work was handled by only one crew. A number of wooden structures which had been used for several years were replaced, weeds cut along the canal banks, and silt removed from the smaller laterals during the dry periods. Only one break occurred in the canal system during the year; this was on the upper main lateral caused by melting snow during the spring run-off. The break, however, was not serious and was easily repaired. The season's operations were characterized by the heavy spring run-off, which was about 40 per cent in excess of the mean for the 14-year period during which records have been kept. This flood, which reached the maximum of about 400 second-feet on June 26 at the measuring weir below Conconully Dam caused considerable damage to bridges along the county roads and the intakes of private canals which had not been constructed to withstand such a flow of water. The flood run-off continued from April 29 until July 21 when the waters again receded below the spillway crest at Conconully Dam and the out flow from the reservoir was reduced to the amount demanded for irrigation. The flood waters did not reach the spill-

way crest until June 16 as the outlet gates had been raised on April 29, and the water allowed to run to waste in an effort to control the flood when the run-off should reach its height. During this flood period the canal system was operated to full capacity and all water users were encouraged to take as large a head of water as they could utilize in order to get the lands well saturated and thus save water later in the season after the flood run-off was past. A charge was made for only two-thirds of the amount actually delivered in accordance with a petition of the trustees of the Okanogan Water Users' Association, which was approved in Washington. This provision was incorporated in draft of public notice prepared later in the season and submitted for the opening of the third unit and announcing of the charges for the year 1917.

Season of 1917.—The winter of 1916 and 1917, although not characterized by heavy snows, was nevertheless very severe. The minimum temperature for the winter of $-20°$ occurred on December 29. The early part of the winter was as a whole very fine and was notable for the absence of the usual cold north winds which did not come until the latter part of February. Heavy snow occurred on March 12 and it was not until early April that the weather had moderated sufficiently to permit beginning maintenance work of cleaning of canals and laterals. The weather continued backward throughout April and May.

The growing season was even later than that of 1916, which was one of the most backward on record. The fruit trees did not come out in full bloom until about the 10th of May which was from two to three weeks later than normal. The trees bloomed very heavily throughout the project but on account of the cold weather a large proportion of the blossoms dropped off. The regular dropping of fruit occurred the latter part of June and at the close of the year the estimates were that the crop would be considerably lighter than would have been expected in a normal season.

The backward spring delayed construction work on canal lining to such an extent that water for irrigation was not turned on until May 21, and the cool, cloudy weather at that time, accompanied by considerable rain, made the demand for irrigation water even then very light.

In response to the universal demand for increased crop production, a considerable area of new land was broken up and planted to such crops as beans, corn, and potatoes. At the close of the year the largest area in the history of the project was in crops and the indications were for a larger yield of all crops except fruits. There was some winter killing of fruit trees throughout the project and this together with the heavy drop due to the cold backward spring and the severe winds that prevailed during June made apple thinning largely unnecessary. The fruit that remained, however, was in good condition and gave promise of being of excellent quality.

It was necessary to enlarge the operation organization by the addition of another patrolman on account of the opening of the third unit lands to water-right application and the incorporation of the South Side Canal into the project. This waterway, which had been transferred to the United States, was improved by the placing of about 3 miles of concrete lining and over 1 mile of iron-pipe lines with

appurtenant structures for the delivery of water to each individual farm.

The spring run-off of Salmon Creek was not as great as had been anticipated on account of the lighter snow fall in the mountains. The water surface in Conconully Reservoir reached the spillway crest on May 29 and the reservoir remained full until June 23, when the project canals and private ditches were diverting the entire flow of the creek. During this period approximately 6,000 acre-feet of water were wasted or only about 26 per cent of the amount wasted in 1916. After the irrigation season began on May 21 considerable difficulty was experienced from weeds blown into the canals by the high winds which caused numerous small breaks at the lower end of the canal system. It was also found that a considerable number of wooden structures which had been in use since the beginning of the project had rotted and it was necessary to replace them before water delivery could be made. Otherwise the maintenance work consisted of the usual cleaning of the canals and repairs to banks and structures.

Historical review, Okanogan project.

Item.	1912	1913	1914	1915	1916	[1]1917
Acreage for which service was prepared to supply water.	10,051	10,084	10,099	10,099	10,099	10,099
Acreage irrigated	7,263	7,700	7,740	7,800	7,850	8,000
Miles of canal operated	46	47	74	77	77	80
Water diverted (acre-feet)	18,740	20,300	29,700	24,640	25,947	26,000
Water delivered to land (acre-feet)	9,040	11,993	20,035	18,580	19,615	21,000
Per acre of land irrigated (acre-feet)	1.24	1.57	2.59	2.38	2.50	2.62

[1] Estimated.

SETTLEMENT.

There was a noticeable improvement manifested throughout the project during the year in economic conditions. The farmers, not only on the project but also on the dry farms on the surrounding hills received a considerable revenue from their crops, which was largely expended in making necessary permanent improvements. On the project this was largely manifested in the erection of packing sheds and storage warehouses for the proper handling of the fruit crop. Labor was scarce throughout the country, consequently wages were good and those who had no crops of their own received a good income in assisting to harvest the crops in the bearing orchards. There was a steady increase in business of all kinds, due not only to the increased crops on the project but to the opening of the Colville Indian Reservation which caused a considerable influx of home-seekers and speculators. There was very little movement of the irrigated lands, but a number of transfers were made of grain and stock ranches in the hills adjacent to the project.

There has been very little change in land values on the project; if anything prices have slightly declined. In many instances well-improved young orchards just arriving at the bearing stage can be purchased at prices paid for the raw land seven or eight years ago and it is now believed that these prices are getting down to a basis of actual value. The land investment report compiled at the close

of the year 1916 shows a total gross land value of about $2,800,000 or about $350 per acre for the area cleared and leveled. The value of stock and equipment is slightly in excess of $20 per acre based on the area cleared and cultivated during the year. Bank deposits show a small increase for the year, which is a healthy indication, considering the amount of money that has been spent in development and improvement work along the lines already mentioned. This improvement work is also manifested in the three towns of the project—Okanogan, Omak, and Riverside. In Okanogan especially considerable municipal improvements in the way of street grading and surfacing and the construction of cement sidewalks were carried on. Several business houses of permanent construction and a number of comfortable residences were built in both Okanogan and Omak.

The local units of the Fruit Growers' League constructed permanent packing and shipping warehouses for handling the project fruit crop. These have frost-proof storage warehouses with capacity for a considerable proportion of the year's crop, if necessary to hold it over winter.

Settlement data, Okanogan project.

Item.	1913	1914	1915	1916	1917
Total number of farms on project	525	550	560	560	560
Population	1,200	921	900	1,021	1,050
Number of irrigated farms	441	450	440	458	475
Operated by owners or managers	439	448	434	453	465
Operated by tenants	2	2	6	5	10
Population	1,200	921	900	1,021	1,050
Number of towns	3	3	3	3	3
Population	1,200	1,350	1,500	1,600	1,700
Total population in town and on farms	2,400	2,271	2,400	2,621	2,750
Number of public schools	7	7	7	7	7
Number of churches	6	7	8	8	8
Number of banks	4	4	4	4	4
Total capital stock	$135,000	$135,000	$135,000	$135,000	$135,000
Total amount of deposits	$250,000	$272,000	$325,000	$400,000	$450,000
Total number of depositors	1,485	1,589	1,650	1,700	1,750

PRINCIPAL CROPS.

The area cropped during the year was 5,242 acres, which was an increase of about 9 per cent over the area for the preceeding year. The total value of the crops produced was $328,385, or an average of $62.64 per acre cropped, and an increase of about 29 per cent over corresponding figures for 1915. The principal increase was due to the production of apples and alfalfa hay, which yielded a value of about $283,000. Of the area cropped about 6,000 acres are planted to orchards, 1,000 acres to alfalfa-producing hay, and the remaining 850 acres in young alfalfa, garden truck, and various miscellaneous crops.

The total fruit shipments from the project amounted to about 400 cars, of which 377 cars were apples and the remainder peaches, pears, and apricots. The average return to the shipper was $1 per box for apples and pears, 35 cents per box for peaches, and 75 cents per crate for apricots. Practically all of the fruit shipped was packed and handled at the three central packing houses on the project, which were constructed and operated by organizations of local growers. In this way a more uniform system of packing the fruit could be maintained and the methods of inspection more system-

atically applied. The selling was done by contracts executed by the local units with some of the principal selling organizations operating in the Northwest, all of which was under the supervision of the Fruit Growers' Agency (Inc.), which is the central organization having control over these selling concerns. The system of inspection was very thorough due to the cooperation between the local organizations and the State horticultural officials. As a consequence a large percentage of the fruit shipped was a fancy grade and will do much toward stabilizing the local brand under which the fruit is shipped, provided the same care and thoroughness continue to be manifested. The growers on the project seem to have been impressed by the difficulties of some of the older horticultural sections of the State, and have exercised considerable care in the matter of proper methods of pruning, spraying, and handling fruit. On account of the thoroughness with which this work was performed, very little trouble was experienced from fruit pests of any description. Fire blight was discovered in a few orchards early in the season, but prompt measures were taken to eradicate it, and no further trouble was given from this cause during the year.

Crop report, Okanogan project, Washington, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa	1,511	Tons	4,171½	2.8	$10.00	$41,715	$27.60
Apples	3,795	Pounds	9,667,520	2,550	.025	241,688	63.70
Apricots	36	do	125,367	3,470	.03	3,761	104.00
Beans	5	Bushels	45½	9	4.80	218	43.60
Beets, stock	1½	Tons	29	20	20.00	580	386.60
Carrots	5½	do	20½	4	15.00	308	56.00
Clover	94	do	170½	1.8	12.00	2,046	21.70
Corn, Indian	76	Bushels	2,519	33	.75	1,889	24.80
Corn, fodder	60	Tons	142	2.4	8.00	1,136	19.00
Fruits, small	23	Pounds	84,783	3,665	.03	2,543	110.00
Garden	110					10,507	95.70
Hay	274	Tons	379	1.4	10.00	3,790	13.80
Onions	1¾	Bushels	270	154	1.50	405	230.00
Pasture	16					192	12.00
Peaches	82	Pounds	434,800	5,319	.0175	7,609	93.00
Pears	37	do	124,400	3,362	.025	3,110	84.00
Prunes	5¼	do	11,080	2,110	.025	277	52.80
Potatoes	74	Bushels	6,821	93	.90	6,139	83.00
Wheat	5	do	60	12	1.00	60	12.00
Miscellaneous	1½					412	275.00
Less duplicated areas	971½						
Total cropped acreage	5,242	Total and average				328,385	62.64

Areas.	Acres.	Farms.	Per cent of project.
Irrigable area farms reported	8,450	458	83.6
Irrigated area farms reported	7,850	458	77.7
Under water-right applications	6,344	404	62.8
Under rental contracts	125	14	1.2
Vested water rights	1,381	40	13.6
Total cropped area farms reported	5,242	458	51.9

Irrigated, no crop:	
Nonbearing orchard	1,831
Young alfalfa	206
Miscellaneous	814
Less duplicated areas	243
Total irrigated acreage	7,850

PUBLIC NOTICES AND ORDERS.

PUBLIC NOTICE, APRIL 18, 1917.

1. In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplementary thereto, and particularly of the reclamation extension act of August 13, 1914 (38 Stat., 686), public notice for the first, second, and third units of the Okanogan project, Washington, is hereby issued as follows:

2. *Lands for which water will be furnished.*—Upon proper application being made therefor water will be furnished under said project in the irrigation season of 1917, and thereafter, for the irrigable lands of the first, second, and third units of said project (except as hereinafter noted), shown on the farm-unit plats of the following townships of the Willamette meridian, to wit:

First unit: T. 33 N., R. 26 E.; T. 34 N., R. 26 E.

Second unit: T. 34 N., R. 26 E.; T. 34 N., R. 27 E.

Third unit: T. 33 N., R. 25 E.; T. 34 N., R. 25 E.; T. 33 N., R. 26 E.

Said plats of the first unit were approved by the Secretary of the Interior November 11, 1908, and the plats of the second unit were so approved February 28, 1910. In the third unit the plats of T. 33 N., R. 25 E. and T. 34 N., R. 25 E. were so approved March 29, 1911, and the plat of T. 33 N., R. 26 E. was so approved March 18, 1917. All of said plats are on file in the office of the project manager, United States Reclamation Service, Okanogan, Wash., and the local land office at Waterville, Wash.

There are excepted, however, from the application of this notice, in so far as the construction charge referred to in paragraphs 5, 6, and 7 is concerned, those lands the owners whereof elected not to take advantage of the provisions of the orders of March 28, 1911, and April 29, 1912. As to these lands the public notices of November 12, 1908, March 12, 1910, April 8, 1910, and March 10, 1913, respectively, shall be and remain in full force and effect. The said lands are described as follows, to wit:

Serial No. 15: Pt. NW. $\frac{1}{4}$ SE. $\frac{1}{4}$ of sections 5–33–26, 19 acres.

Serial No. 209: Pt. SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ of sections 23–34–26, 7 acres.

Serial No. 270: E. 15 acres of NW. $\frac{1}{4}$ NW. $\frac{1}{4}$ of sections 9–33–26, 15 acres.

Serial No. 365: SW. $\frac{1}{4}$ NW. $\frac{1}{4}$ NE. $\frac{1}{4}$ W. $\frac{1}{2}$ SW. $\frac{1}{4}$ NE. $\frac{1}{4}$ and W. $\frac{1}{2}$ E. $\frac{1}{2}$ SW. $\frac{1}{4}$ NE. $\frac{1}{4}$ of sections 10–34–26, 24 acres.

Serial No. 495: Pt. N. $\frac{1}{2}$ SE. $\frac{1}{4}$ SW. $\frac{1}{4}$ of sections 21–34–26, 4 acres.

Serial No. 564: SW. $\frac{1}{4}$ SE. $\frac{1}{4}$ of sections 13–33–25, 20 acres.

The above excepted lands, however, shall be subject to the same operation and maintenance charges, and to the same rules and regulations governing the delivery of water as the other lands covered by this notice.

3. *Limit of area for which water right may be secured.*—The maximum limit of area for which water-right application may be made for lands in private ownership shall be 40 acres of irrigable land for each land owner.

4. *Application for water right.*—All water-right applications must be made to the project manager, United States Reclamation Service,

Okanogan, Wash., upon forms provided for that purpose, and may be made on and after the date hereof: *Provided*, That for all lands for which water-right application has been made heretofore in due form no further application shall be necessary, but the charges and payment dates in each such case shall conform to the terms and conditions of this public notice.

5. *Classes of charges for water rights.*—The water-right charges are of two kinds, to wit: (1) A charge against each irrigable acre to cover cost of construction of the irrigation system, termed the "construction charge;" and (2) an annual charge against each irrigable acre to cover cost of operation and maintenance of the system, termed the " operation and maintenance charge."

6. *General construction charge.*—The construction charge shall be $95 per irrigable acre (less any amount heretofore paid per irrigable acre, upon any construction charge against the land in question, under any public notice heretofore issued for the project), which charge shall be payable in 20 annual installments, the first of which for lands of the first and second units shall become due and payable on December 1, 1917, and for lands of the third unit on December 1 following the date of water-right application, and subsequent installments in each case on December 1 of each year thereafter. The first 4 installments shall each be 2 per cent, the next 2 installments shall each be 4 per cent, and the next 14 each 6 per cent, of the total construction charge decreased to the extent of any payments heretofore made thereon as aforesaid, and increased by any unpaid water rental or operation and maintenance charge heretofore authorized for the calendar year 1914, when such increase is requested by the water-right applicant.

7. *Credit to construction charge against certain lands.*—Certain lands under said project shall be entitled to a credit on the above-mentioned construction charge, on account of the fact that the distribution system which is necessary to carry water to said lands had been partially constructed before the work of the building of said system was undertaken by the United States. For all of such lands which have heretofore entered into a supplemental stock subscription with the Okanogan Water Users' Association showing a credit for such construction, the amount of said credit is hereby fixed at $16 per irrigable acre: *Provided, however*, That such credit shall not apply to such of those lands receiving water under what is known as the South Side ditch as secure the benefit of supplemental construction to be done by the United States upon said ditch. The notations on the farm-unit plats heretofore approved providing for credits of $10 and $6, respectively, are hereby vacated and set aside.

8. *Increased construction charge in certain cases.*—In all cases where water-right application for lands in private ownership or for lands under entries not subject to the reclamation law shall not be made within one year from the date hereof, the construction charge for such lands shall be increased 5 per cent each year until such application is made and an initial installment is paid.

9. *Advance payment of construction charge permissible.*—Any water-right applicant may, at his option, pay in advance the whole or any part of the construction charge owing by him within any shorter period than that prescribed by this notice.

10. *Operation and maintenance charge.*—For the purpose of fixing the amounts of the operation and maintenance charge, all of the said lands have been divided into four classes, the location of which is shown on maps on file in the office of said project manager, to wit:

(Class A) lands with a light volcanic ash soil requiring the minimum amount of water for irrigation.

(Class B) lands requiring a larger amount of water than class A, but not so much as class C.

(Class C) lands having the coarsest and most porous soils and requiring the maximum amount of water.

(Class D) credit lands, which on account of the fact that they receive water through distribution systems not operated by the United States are entitled to receive water at a less charge.

The operation and maintenance charge for the year 1917 and thereafter until further notice shall be $1.50 per irrigable acre, whether water is used thereon or not, which will entitle said lands to water not exceeding the following amounts per irrigable acre: Class A, 1 acre-foot, measured on the land; class B, 1½ acre-feet, measured on the land; class C, 2 acre-feet, measured on the land; class D, 3 acre-feet measured at the point of diversion from Salmon Creek. Further water will be furnished up to a limit of one additional acre-foot per irrigable acre, at the rate of 50 cents per acre-foot, and all further supply at 75 cents per acre-foot. All operation and maintenance charges will be due and payable on March 1 following the irrigation season.

The above charges are subject to the condition that, during the flood-water period of each year, as determined by the project manager, each water user shall be charged with only two-thirds of the water delivered.

11. *Place and method of payment of water-right charges.*—All water-right charges must be paid at the office of the United States Reclamation Service at Okanogan, Wash., in cash or by New York draft or money order made payable to the special fiscal agent, United States Reclamation Service.

FRANKLIN K. LANE,
Secretary of the Interior.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix, p. 522.]

Feature costs of Okanogan project to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys		$4,603.27
Storage works:		
Salmon Lake Reservoir—		
Inlet canal		1,999.00
Outlet works		6,578.52
Salmon Lake Dam	$2,486.01	2,486.01
	2,486.01	11,063.53
Conconully Reservoir—		
Real estate	4,890.00	42,678.60
Clearing reservoir site		8,913.05
Conconully Dam		221,830.99
Spillway		37,770.79
Outlet works		24,499.19
	4,890.00	335,692.62
	7,376.01	346,756.15
Pumping for irrigation:		
Power plant No. 1	191.59	11,869.44
Power plant No. 2	271.20	13,868.79
Pumping plant	386.70	30,077.24
	849.49	55,815.47
Lateral system:		
Diversion weir		4,152.89
Main canal, main laterals, and sublaterals—		
Completed work to June 30, 1916		213,772.72
Concrete lining of canals	11,736.53	136,146.57
Extension distribution system	1,368.14	45,429.65
South Side Canal	8,110.11	8,110.11
	21,214.78	407,611.94
Power system, transmission line	10.62	5,445.83
Farm units		1,889.92
Permanent improvements:		
Roads		1,105.98
Buildings		7,265.30
		8,371.28
Telephone system		6,698.10
Operation and maintenance during construction		4,736.36
Plant accounts		1,314.47
Gross construction cost of project to June 30, 1917	29,450.90	843,242.79
Less revenues earned during construction period:		
Rental of buildings		224.00
Rental of grazing and farming lands		540.00
Rental of irrigation water		1,670.50
Profit on hospital operations	[1] 99.20	233.58
Other profits on operations, unclassified	[1] 7.73	[1] 7.73
Profit on mess- house operations		[1] 193.83
	[1] 106.93	2,466.52
Net cost of construction of project to June 30, 1917		840,776.27

[1] Deduct.

Statement of cost by calendar years, Okanogan project.

Year ending Dec. 31—	Construction.	Operation and maintenance.			Total cost.
		During construction.	Under public notice.	Total.	
1903	$12,854.78				$12,854.78
1904	5,037.06				5,037.06
1905	8,353.56				8,353.56
1906	64,175.40				64,175.40
1907	233,066.03				233,066.03
1908	106,856.55	$4,138.88		$4,138.88	110,995.43
1909	84,457.58	597.48	$6,985.35	7,582.83	92,040.41
1910	41,424.39		10,236.20	10,236.20	51,660.59
1911	8,312.40		17,052.52	17,052.52	25,364.92
1912	48,857.05		13,643.66	13,643.66	62,500.71
1913	46,820.20		9,508.76	9,508.76	56,328.96
1914	86,932.97		9,782.69	9,782.69	96,715.66
1915	48,501.61		11,935.89	11,935.89	60,437.50
1916	23,636.76		13,983.82	13,983.82	37,620.58
January to June 30, 1917	17,905.62		7,406.07	7,406.07	25,311.69
Plant accounts	1,314.47				1,314.47
Total	838,506.43	4,736.36	100,534.96	105,271.32	943,777.75

Statement of cost by fiscal years, Okanogan project.

Year ending June 30—	Construction.	Operation and maintenance.			Total cost.
		During construction.	Under public notice.	Total.	
1903	$991.31				$991.31
1904	14,549.91				14,549.91
1905	4,550.62				4,550.62
1906	13,739.41				13,739.41
1907	148,141.69				148,141.69
1908	192,800.04	$2,703.12		$2,703.12	195,503.16
1909	96,397.93	2,033.24	$3,588.92	5,622.16	102,020.09
1910	80,212.40		8,588.62	8,588.62	88,801.02
1911	4,974.75		15,321.94	15,321.94	20,296.69
1912	28,937.77		15,158.17	15,158.17	44,095.94
1913	41,562.49		12,289.34	12,289.34	53,851.83
1914	56,180.31		8,502.35	8,502.35	64,682.66
1915	95,926.53		10,313.00	10,313.00	106,239.53
1916	28,775.90		13,534.42	13,534.42	42,310.32
1917	29,450.90		13,238.20	13,238.20	42,689.10
Plant accounts	1,314.47				1,314.47
Total	838,506.43	4,736.36	100,534.96	105,271.32	943,777.75

Estimated cost of contemplated work on Okanogan project, fiscal year 1918.

Features.	Estimated cost during fiscal year 1918.
Storage system: Conconully drainage and land purchases	$5,000.00
Lateral system: Laterals and sublaterals	2,500.00
Operation and maintenance under public notice	21,000.00
Stores and other operations	250.00
Plant and equipment	750.00
Total	29,500.00

WASHINGTON, YAKIMA PROJECT.

R. K. TIFFANY, project manager, Sunnyside and Tieton units, North Yakima, Wash.; C. H. SWIGART, construction engineer, storage unit, Rimrock, Wash.

LOCATION.

Counties: Yakima, Benton, and Kittitas.

Townships: 8 to 22 N., Rs. 11 to 27 E., Willamette meridian.

Railroads: Northern Pacific; Chicago, Milwaukee & St. Paul; Oregon-Washington Railroad & Navigation Co.; Yakima Valley Transportation Co.

Railroad stations and estimated population January 1, 1917: Grandview, 700; Sunnyside, 1,430; Outlook, 150; Granger, 360; Zillah, 500; Mabton, 600; Donald, 50; Benton City, 50; Prosser, 1,500; Ellensburg, 5,000; Thorp, 300; Yakima, 200; North Yakima, 16,500; Naches, 500; Wapato, 500; Toppenish, 1,700; and Parker, 50.

WATER SUPPLY.

SUNNYSIDE UNIT.

Source of water supply: Yakima River and tributaries.

Area of drainage basin: 3,550 square miles.

Annual run-off in acre-feet of Yakima River at Union Gap: 3,550 square miles, 1897 to 1916, maximum, 4,680,000; minimum, 1,570,000; mean, 3,290,000.

TIETON UNIT.

Source of water supply: Tieton River and its tributaries.

Area of drainage basin: 247 square miles.

Annual run-off in acre-feet of Tieton River at canal headworks, 1908–1916, maximum, 484,000; minimum, 252,000; mean, 300,000.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which service is prepared to supply water, season of 1917: Sunnyside unit, 97,176 acres; Tieton unit, 34,000 acres.

Area under water-right applications and rental contracts, season of 1917: Sunnyside unit, 92,503 acres; Tieton unit, 29,991 acres.

Length of irrigating season: Sunnyside unit, April 1 to October 31, 214 days; Tieton unit, May 1 to October 1, 153 days.

Average elevation of irrigible area: 1,000 feet above sea level.

Rainfall on irrigable area: At Sunnyside, 1895 to 1916, average, 6.7 inches; 1916, 7.21 inches; at Tieton, 1916, 8.99 inches.

Range of temperature on irrigable area: −21° to 110° F.

Character of soil of irrigable area: Sunnyside unit—on about three-fourths of the unit the soil is sandy loam or volcanic ash from 10 to 60 feet deep. The remainder is decomposed basalt, underlain by gravel or a combination of this with the above-named soils. Tieton unit—volcanic ash.

Principal products: Forage, hops, vegetables, and fruit; stock and dairy products.

Principal markets: The cities of Washington, Oregon, and California; all Alaska trading points; fruit markets, including all eastern cities.

LANDS OPENED FOR IRRIGATION.

SUNNYSIDE UNIT.

Dates of public notices: November 18, 1908; March 2, 1909; April 18, April 19, May 2, 1910; March 15, 1911; February 29, May 31, 1912; June 16, June 23, October 2, 1913; March 10, April 11, and September 24, 1914; March 31, July 27, 1915; April 6, May 31, 1916; May 16, 1917.

Location of lands opened: Tps. 8 to 12 N., Rs. 19 to 27 E., Willamette meridian.

Present status of irrigable lands opened: 2,588 acres entered subject to reclamation act; 864 acres of State lands; 93,724 acres in private ownership.

Duty of water: 3 acre-feet per acre per annum at the farm.

Limit of area of farm units: Public, 80 acres; private, 160 acres.

Building charge per acre of irrigable land: $52.

Annual operation and maintenance charge: $1 per acre vested water rights: 80 cents for 2 acre-feet, $1.05 for 3 acre-feet, $1.65 for 4 acre-feet, and 80 cents additional for each acre-foot thereafter for public notice lands.

TIETON UNIT.

Dates of public notices and orders: November 7, 1910; March 8, April 14, 1911; January 24, February 21, April 18, May 10, 1912; March 21, April 25, June 16, 1913; March 4, September 24, 1914; March 9, March 20, October 30, 1915; March 16, April 3, 1916; March 17, 1917.

Location of lands opened: Tps. 12 to 15 N., Rs. 16 to 18 E., Willamette meridian.

Present status of irrigable lands opened: 2,039.13 acres entered subject to the reclamation act; 81.13 acres open to entry; 27,952.14 acres in private ownership covered by water-right application; 3,424.5 acres in private ownership unapplied for.

Duty of water: That quantity of water which shall be beneficially used for the irrigation of the lands and in no case exceed the share proportionate to irrigable acreage of water supply actually available. The average use is about 2 acre-feet per acre delivered at the farm.

Limit of area of farm units: Public, 40 acres; private, 160 acres.

Building charge per acre of irrigable land: $93.

Annual operation and maintenance charge: Minimum, $1 per acre of irrigable land for 1 acre-foot or less; additional quantities to be delivered where needed and charged for at the rate of 75 cents per acre-foot.

CHRONOLOGICAL SUMMARY.

Reconnoissance and preliminary surveys in 1903.

Report of board of engineers recommending construction October 16, 1905.

Construction of Sunnyside and Tieton units authorized by Secretary December 12, 1905; Wapato unit, June 16, 1906.

Sunnyside Canal purchased June 23, 1906.

First irrigation by Reclamation Service, Sunnyside unit, season of 1907.

Tieton diversion dam completed December, 1908.

Tieton Main Canal completed in 1909.

Bumping Lake Dam completed in 1910.

First irrigation by Reclamation Service, Tieton unit, season of 1911.

Distribution system, Sunnyside unit, completed in 1911.

Tieton unit completed winter of 1911–12.

Kachess Dam completed fall of 1912.

Warren Act contract with Kittitas reclamation district executed by Secretary of Interior January 18, 1913.

Contract with Sunnyside irrigation district signed October 6, 1914.

Contract with Snipes Mountain irrigation district signed November 16, 1914.

Contract with Outlook irrigation district signed November 23, 1914.

Completion of Bumping Lake Reservoir clearing October 15, 1915.

Clear Creek Dam completed November, 1915.

Construction for Sunnyside irrigation district (Benton extension) completed April, 1916.

Construction for Outlook irrigation district completed June 1, 1916.

Construction for Snipes Mountain irrigation district completed June 30, 1916.

Contract with Grandview irrigation district signed August 4, 1916. Construction completed July 31, 1917. Construction, gravity system, completed June 30, 1917.

Per cent completed June 30, 1917: Storage unit, 37 per cent; Sunnyside unit, 91 per cent; Tieton unit, 99 per cent.

IRRIGATION PLAN.

The irrigation plan of the Yakima project provides for the storage of flood waters of the Yakima River and its tributaries in Kachess, Keechelus, Clealum, and Bumping Lakes, and in a reservoir at McAlister Meadows; the diversion of water from the Yakima River for the irrigation of 62,000 acres of land on both sides of the river in the vicinity of Ellensburg, comprising the Kittitas unit; the diversion of water from the east bank of the Yakima River near Parker for the irrigation of 110,828 acres of land by

means of the old Sunnyside Canal, as improved and extended by the Reclamation Service, comprising the Sunnyside unit; the diversion of water from the Tieton River below McAlister Meadows (a reservoir being provided on the headwaters of this stream to regulate diurnal flow) for the irrigation of 34,000 acres of land lying between the Naches River and Ahtanum Creek, in the vicinity of North Yakima, comprising the Tieton unit; and the diversion of water from the west bank of the Yakima River near Parker for the irrigation by means of the canal system of the Yakima Indian Reservation, improved and extended, of 106,000 acres of land by gravity and 14,000 acres of land by pumping with power developed at drops in the canals, comprising the Wapato unit. The plan also provides for the development of power from drops in the main canals and laterals of the Sunnyside and Tieton units to be used for pumping irrigation water and for other purposes. The United States claims all waste, seepage, spring, and percolating water arising within the project and proposes to use such water in connection therewith.

The following features of the above plan have been completed: Sunnyside unit: Diversion dam, enlargement of main canal, Sulphur Creek wasteway, and the distribution system; Benton extension (Sunnyside irrigation district); Snipes Mountain irrigation district (pumping unit); Outlook irrigation district (pumping unit); Grandview irrigation district (pumping unit). Tieton unit: Bumping Lake storage dam, Clear Creek Dam, extension of Tieton Canyon road to site of Clear Creek regulating reservoir on the headwaters of the Tieton River, Tieton River diversion dam, main canal, and distribution system. Storage unit: Kachess Dam; construction work is in progress on Keechelus Dam, the clearing of reservoir sites at Bumping Lake, Lakes Kachess, Keechelus, and Clealum. . The features for future construction are: Mabton and Prosser pumping plants and Granger siphon, with necessary distribution systems; Clealum and Tieton Reservoirs.

SUMMARY OF GENERAL DATA FOR YAKIMA PROJECT TO END OF FISCAL YEAR 1917.

STORAGE UNIT.

Finances:		
Gross construction cost to end of fiscal year		$2,873,595.02
Per cent complete at end of fiscal year		37
Appropriated for fiscal year 1918, total		$872,000.00
Allotment for construction, fiscal year 1918		$529,400.00
Estimated per cent complete, June 30, 1918		46.5
Proposed appropriation, fiscal year 1919, for construction		$600,000.00
Estimated gross construction expenditures to June 30, 1919		$4,002,995.02
Estimated per cent complete, June 30, 1919		55.5
Appropriation, fiscal year 1917 for all units of project		[1]$1,508,215.45
Expenditures during fiscal year, chargeable to 1917 appropriation—		
Disbursements	$594,282.30	
Transfers	70,490.34	
	$664,772.64	
Registered liabilities chargeable to 1917 appropriation	134,570.62	
Total encumbrances for storage unit, fiscal year 1917		799,343.26
Unencumbered balance, July 1, 1917, carried to Sunnyside unit		708,872.19
Repayments:		
Construction charges—		
Accrued to end of fiscal year		$312,005.35
Collected to end of fiscal year		312,005.35
Water-rental charges—		
Accrued to end of fiscal year		$4,305.00
Collected to end of fiscal year		4,305.00

[1] Includes balance of 1916 appropriation and refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

SUNNYSIDE UNIT.

Areas:		
Irrigable acreage when project is complete		110,828
Public land entered to end of fiscal year	2,588	
Public land withdrawn at end of fiscal year	39	
State land	1,158	
Private land	107,043	
Acreage service could have supplied, season of 1916		93,226
Addition in fiscal year 1917		3,950
Estimated addition in fiscal year, 1918		2,080
Estimated acreage service can supply July 1, 1918		99,256
Acreage actually irrigated, season of 1916		73,000
Acreage cropped under irrigation, season of 1916		59,449
Crops:		
Value of irrigated crops, season of 1916		$4,341,940.00
Value of irrigated crops, per acre cropped		$73.04
Finances:		
Gross construction cost to end of fiscal year		$3,151,490.84
Per cent complete at end of fiscal year		91
Appropriated for fiscal year 1918, total		$242,000.00
Allotment for construction, fiscal year 1918		$144,000.00
Estimated per cent complete, June 30, 1918		97
Estimated gross construction expenditures to June 30, 1919		$3,473,894.00
Estimated per cent complete, June 30, 1919		97
Announced construction charges per acre		$52.00
Balance of appropriation, fiscal year 1917, from storage unit		$708,872.19
Expenditures during fiscal year chargeable to 1917 appropriation—		
Disbursements	$269,760.38	
Transfers	19,022.96	
	$288,783.34	
Registered liabilities chargeable to 1917 appropriation	22,996.91	
Contract obligations wholly covered by 1917 appropriation	11,070.17	
		322,850.42
Unencumbered balance, July 1, 1917, carried to Tieton unit		386,021.77
Repayments:		
Construction charges—		
Accrued to end of fiscal year 1917		758,167.15
Collected to end of fiscal year 1917		724,988.70
Uncollected at end of fiscal year 1917		33,178.45
Operation and maintenance charges—		
Accrued to end of fiscal year 1917		662,180.60
Collected to end of fiscal year 1917		623,986.45
Uncollected at end of fiscal year 1917		38,194.15
Water-rental charges—		
Accrued to end of fiscal year 1917		42,174.38
Collected to end of fiscal year 1917		42,174.38
Power earnings—		
Accrued to end of fiscal year		1,869.20
Collected to end of fiscal year		1,869.20
Drainage (drainage system being constructed by local drainage districts):		
Estimated acreage damaged by seepage to end of fiscal year		10,000
Estimated acreage protected by drains built to end of fiscal year		40,000
Cost of drainage works to end of fiscal year (investigation only)		$11,418.80

TIETON UNIT.

Areas:		
Irrigable acreage when project is complete		33,590
Public land entered to end of fiscal year 1917	2,039	
Public land open to entry at end of fiscal year 1917	81	
Public land withdrawn at end of fiscal year	93	
State and railroad land	2,603	
Private land	28,774	
Acreage service could have supplied season of 1916		30,000
Estimated acreage service can supply July 1, 1918		31,000
Acreage actually irrigated, season of 1916		23,000
Acreage cropped under irrigation, season of 1916		21,000
Crops:		
Value of irrigated crops, season of 1916		$1,102,536.00
Value of irrigated crops per acre cropped		$52.50
Finances:		
Gross construction cost to end of fiscal year		[1] $3,200,274.06
Per cent complete at end of fiscal year		99
Appropriated for fiscal year 1918, total		$30,000.00
Allotment for construction, fiscal year 1918		$30,000.00
Estimated per cent complete, June 30, 1918		99.3
Proposed appropriation, fiscal year 1919, for construction		$45,000.00
Estimated gross construction expenditures to June 30, 1919		$3,275,274.06
Estimated per cent complete, June 30, 1919		99.6
Announced construction charges per acre		$93.00
Balance of appropriation, fiscal year 1917, from Sunnyside unit		$386,021.77
Expenditures during fiscal year chargeable to 1917 appropriation—		
Disbursements	$61,337.14	
Transfers	4,210.43	
	$65,547.57	
Registered liabilities chargeable to 1917 appropriation	5,249.89	
Contract obligations wholly covered by 1917 appropriation	4,440.00	
		75,237.46
Unencumbered balance, July 1, 1917, for entire project		310,784.31
Repayments:		
Construction charges—		
Accrued to end of fiscal year 1917		339,326.89
Collected to end of fiscal year 1917		322,731.33
Uncollected at end of fiscal year 1917		16,595.56
Operation and maintenance charges (public notice)—		
Accrued to end of fiscal year 1917		205,516.95
Collected to end of fiscal year 1917		186,852.83
Uncollected at end of fiscal year 1917		18,664.12
Water-rental charges—		
Accrued to end of fiscal year 1917		$4,546.25
Collected to end of fiscal year 1917		$4,546.25
Drainage—Estimated acreage damaged by seepage to end of fiscal year 1917		100

[1] Total construction cost, $3,155,277.08; operation and maintenance cost during construction, $10,208.54; operation and maintenance charges transferred to building, $34,788.44; total cost to end of fiscal year, $3,200,274.06.

STORAGE UNIT.

CONSTRUCTION DURING FISCAL YEAR.

Kachess and Clealum Dams.—No construction work was done at the dam sites during the year. Operation and maintenance of the permanent dam at Lake Kachess and the crib dam at Lake Clealum were continued throughout the year.

Keechelus Dam.—During the year the concrete in the gate tower was completed and all gates, machinery, and grillage set. The stilling pool at the end of the conduit was constructed and grouted and dry paving laid in the outlet channel for 300 feet. The material washed into the outlet channel by the break in cofferdam No. 3 was excavated and the channel practically completed.

The portion of the river bed under the dam not disturbed during the construction of the conduit was stripped before the placing of material in the dam could begin. The concrete core wall was completed across the river section after the removal of the river diversion flume. The back filling around the conduit was finished and also the embankment, consisting of gravel fill, rolled earth fill, foundation rock, riprap, and lower slope paving.

The excavation of the spillway was completed and the concrete weir and lining were placed.

The footbridge from the dam to the outlet tower and the wagon bridge across the spillway channel were erected.

The work accomplished during the year was as follows: Excavation, 39,506 cubic yards; concrete, 3,763 cubic yards; embankment, 193,856 cubic yards; and riprap, 14,445 cubic yards.

Keechelus Dam is 94 per cent completed.

The clearing of the reservoir site was continued with approximately 415 acres cleared during the year.

Tieton Reservoir Dam.—The dam site is located 26 miles from Naches, on the Tieton River. Work was started in January with the construction of a receiving warehouse at Naches. Practically 20 miles of road had to be reconstructed, including the building of four bridges. Camp buildings and construction plants have been erected and the power system started; water supply and sewage systems are under construction.

BOARD MEETINGS.

Date.	Topic.	Personnel.
July 22 and 23, 1917	Future construction program	A. P. Davis, chief engineer; F. E. Weymouth, chief of construction; R. K. Tiffany, project manager; and C. E. Crownover, project manager.
Feb. 28 and 31, 1917	Methods and plans of construction of the Tieton Reservoir Dam.	D. C. Henny, A. J. Wiley, and Charles H. Swigart, consulting engineers; C. E. Crownover, project manager.

SUNNYSIDE UNIT.

CONSTRUCTION DURING FISCAL YEAR.

Construction work on the gravity system consisted of the extension of the distribution system for lands just completing water-right application, the building of turnouts and deliveries from the Main

Canal, the placing of gravel riprap along the Main Canal from mile 0 to mile 50, and the lining of Snipes Mountain Canal from mile 7.7 to mile 9.

The extension of the distribution system consisted of the construction of small laterals, flumes, pipe lines, and concrete and wood structures necessary to carry water from existing canals or laterals to the new lands being placed under cultivation. The two chief items were the construction of two pipe lines to land not heretofore included in the irrigable area of the project, one consisting of 6,440 linear feet of 14-inch pipe and 2,396 linear feet of 10-inch pipe, with the necessary structures, serving 172 acres of land, and the other the construction of 5,300 feet of 16-inch wood pipe and necessary structures, serving 155 acres. Forty-three additional farm-unit deliveries and 27 steel and concrete turnouts were built along the Main Canal, replacing old wooden structures.

During the summer plans were laid to continue riprapping with gravel additional portions of the canal banks wherever heavy erosion had taken place, and after the close of the irrigation season some 2,000 cubic yards of gravel, covering 12,000 lineal feet of canal banks, were placed.

Snipes Mountain Canal was lined with concrete for about 1 mile, where seepage conditions were bad, and operation dangerous. The lining was $2\frac{1}{4}$ inches thick, the bottom 10 feet wide; the water depth 3.2 feet, with a 12-inch freeboard; and the side slopes $1\frac{1}{4}:1$ with a 7-inch berm. A $1:3:3\frac{1}{2}$ mix was used. The sand was hauled by Government forces an average of 3 miles, the gravel by contract forces an average of $1\frac{1}{4}$ miles. The preparation of section was started October 25 and the placing of concrete November 6, 1916. The delivery of the sand and gravel was completed by November 20, but because of severely cold weather, beginning November 11, the preparation of section and placing of concrete were materially interfered with, until finally, on November 16, the work was closed down for the winter. The work of lining was resumed April 12, 1917, and completed April 30, 1917, a total of 1,315 cubic yards of concrete having been placed.

In addition to the work on the gravity system the following work was done in connection with the irrigation districts tributary to the Sunnyside unit:

Snipes Mountain irrigation district.—Extensive alterations were made to both of the water wheel driven centrifugal pumps of the main pumping plant of the Snipes Mountain irrigation district. These changes were undertaken by the manufacturer for the purpose of improving the efficiency of the units and correcting certain difficulties with the bearings which had developed during the operating season of 1916. The work was done during March and April, 1917, and the plant placed in service about April 15. Upon official test the large unit developed an efficiency considerably in excess of that guaranteed by the manufacturer, but the small unit did not show the requisite performance. During the next nonirrigating season further alterations will be made to this small unit. This plant, together with the Hillcrest plant, has been run continuously throughout the seasonable operating portion of the year for the pumping of water to irrigate lands of the district.

Outlook irrigation district.—At the pumping plant of the Outlook irrigation district (built in 1915–16) a new volute casing was furnished by the manufacturer for the 24-inch centrifugal pump of the larger pumping unit. This new casing was installed in March, 1917. In April the pumps were placed in service and an efficiency test conducted upon both pumps. The plant has been operated throughout the year for the delivery of water to the irrigation district.

Grandview irrigation district.—The principal feature of construction undertaken during the year was the building of a power plant, transmission line, pumping station, and distributing system for the irrigation of a tract of 4,000 acres of land near Grandview, Wash. The landowners of this tract formed an irrigation district under State law and contracted with the Government, under date of September 8, 1916, for construction of the necessary irrigation works. The estimated total cost of the work was $206,000. Construction was started during September, 1916, and was 95 per cent completed by June 30, 1917. Delivery of water for irrigation was started April 23, 1917, construction of the pumping plant then being completed to a point where continuous operation of one of the pumping units was possible.

The power plant is situated 1½ miles south of Grandview and develops hydroelectric power at a 75-foot drop in the Rocky Ford Lateral of the Sunnyside Canal. The development comprises a penstock intake structure of concrete, with steel trash racks and a cast-iron head gate, about 400 feet of 36-inch diameter steel penstock, and a concrete power house, 18 by 24 feet in plan, containing a single hydroelectric unit. The power unit consists of a 250-horsepower horizontal type turbine direct connected to a 187-kilowatt alternating current generator. Construction of the plant was started in March, 1917, and was completed by June 30, except for the installation of the machinery, the erecting of about one-half of the steel penstock, and a small amount of back fill and cleaning up. The work was done by Government forces. The hydraulic machinery is being furnished by the Trump Manufacturing Co. and the electrical machinery by the Westinghouse Electric Manufacturing Co.

Power is transmitted from the power plant for a distance of 3 miles to the Grandview pumping plant. Wooden pole line construction is used with copper conductors carrying energy at 6,600 volts. The transmission line was built during May, 1917, by V. V. Vercoe, under contract dated October 3, 1916.

The pumping plant is located on the Sunnyside Main Canal about 2 miles southeast of Grandview. In addition to the electrical power available, about 250 horsepower is developed by a turbine which utilizes a drop of 21 feet from the Main Canal into the Mabton Feeder Canal. The building is of concrete, 18 by 50 feet in plan, and is provided with a 15-ton traveling crane. Three pumping units are provided—one a centrifugal pump direct connected to a hydraulic turbine and the other two units centrifugal pumps driven by electric motors. Construction of the pumping plant was started in October, 1916, and was practically completed in April, 1917. The turbine driven pump was furnished by the S. Morgan Smith Co. This unit was installed, tested, and accepted during March and April, 1917. The efficiency exceeded the manufacturer's guarantees. The two remaining units had not been installed on June 30, as neither the

centrifugal pumps nor the electrical machinery had been delivered by the manufacturer.

For the conveyance of the water from the pumping plant to the lateral system, about 10,000 feet of pipe, 30-inch and 40-inch sizes, were built. This pipe is of the wood-stave type and was built by the Washington Pipe & Foundry Co., under contract. The work was completed during February, 1917.

The lateral system includes 9 miles of concrete-lined canal, 9 miles of earth laterals, 7,600 feet of wood pipe line, 14,000 feet of vitrified clay pipe line, 960 feet of concrete flume, 1,040 feet of metal flume, 6,000 feet of wood flume, and small structures as required for the control and measurement of water to each 40-acre tract of land. Construction of the lateral system was done by Government forces. Work was started in September, 1916, and was practically completed by June 30, 1917.

DRAINAGE.

The drainage system on the Sunnyside unit has been constructed, and is operated and maintained by drainage districts in accordance with the State law. Since 1912, 18 drains with a length of 70 miles have been completed and 4 more are under construction. Of the 70 miles of drains, 50 miles are open ditch and 20 miles are covered tile drains, from 4 to 20 inches diameter. The total excavation for drains built or under construction approximates 1,600,000 cubic yards, at a cost of $543,000, and affects 40,200 acres of land.

Of the 18 drains built, 11, serving 21,000 acres, discharge into Sulphur Creek wasteway, which serves the twofold purpose of a relief for the Main Canal and the main artery of the drainage system for the country between Outlook and Grandview.

OPERATION AND MAINTENANCE.

The operation of the Sunnyside Canal and distribution system from July 1, 1916, to the close of the irrigation season, October 31, 1916, was without incident other than the normal routine, except for leakage on the Mabton siphon under the Yakima River, and two minor breaks on the branch canals. No serious interruption in water service was occasioned, however, and the resultant damage amounted to little more than the cost of necessary repair work.

The maximum diversion for the irrigation season of 1916 was 1,075 second-feet, obtained August 16. This diversion was increased to approximately 1,160 second-feet as a test of the Main Canal capacity. The test was successfully concluded on August 28 and the diversion reduced to the irrigation requirement. The average delivery of water was somewhat above normal, but, with the shortage of the preceding year in mind, somewhat less stringent regulation was imposed and delivery made about in accordance with the demand, provided good use was made of the water delivered.

For the irrigation season of 1917 water was available for 97,176 acres; 92,503 acres were under rental contract or water-right application and water was being delivered June 30 to 78,000 acres. Water was first turned into the canal on March 22. By April 1, 360 second-feet were being diverted from the river, and this amount was gradually increased thereafter in accordance with the irrigation require-

ment. For the period April 1 to June 30, 1917, the maximum diversion was 1,175 second-feet. There was some delay in water delivery on the larger branch canals at the opening of the irrigation season because of maintenance and betterment work underway, but owing to the very cool and backward spring the delay occasioned no inconvenience. In fact, throughout April, because of weather conditions, the demand for water was much below normal.

The maintenance work was done for the most part during the nonirrigation season by the operating force, the water masters acting as general foremen. Canal riders were used as subforemen for the crews organized to prosecute the work and in various capacities on the work, and additional men and teams were secured from neighboring farmers. This consisted of the work necessary to keep the canals in condition for carrying the desired quantities of water, correction and prevention of erosion, removal of silt, strengthening of canal banks, clearing rights of way of weeds, and maintenance of houses and grounds for the canal riders. One small carpenter crew, occupied with the repair and renewal of small structures of the project, was also employed throughout the year.

In addition 70 concrete measuring boxes and 9 steel and concrete turnouts were built to replace an equal number of wooden structures. Approximately 1½ miles of the Mabton siphon were overhauled, replacing rotted pipe staves, 1,700 feet of this siphon being placed on concrete pedestals. Three thousand six hundred feet of 30-inch continuous wood-stave pipe were replaced with 2,550 26-inch diameter inserted joint machine banded wood-stave pipe. The Zillah wasteway was extensively repaired; 1,500 lineal feet of canal were constructed of 50 second-feet capacity, replacing three wooden flumes of like capacity; 2 miles of Snipes Mountain Canal were enlarged to act as a wasteway for the Snipes Mountain pumping plant in times of emergency; a 100-second-foot turnout was installed, connecting Snipes Canal with drainage district No. 2, in order to perform a similar service for the Outlook irrigation district pumps; 10 miles of main canal were widened and sloped to designed capacity; and 7 patrol houses and office buildings at Sunnyside were painted.

Historical review, Sunnyside unit, Yakima project.

Item.	1912	1913	1914	1915	1916	1917
Acreage for which service was prepared to supply water	80,076	80,607	81,306	81,807	93,226	97,176
Acreage irrigated	58,560	62,800	64,100	67,000	73,000	78,000
Number of farms irrigated	2,441	2,450	2,447	2,450	2,553	2,682
Miles of canal operated	513	525	525	525	572	590
Water diverted (acre-feet)	314,733	312,733	316,828	314,057	[1] 276,210	353,287
Water delivered to land (acre-feet)	179,308	194,725	211,902	203,397	180,413	234,662
Per acre of land irrigated (acre-feet)	3.062	3.101	3.310	3.035	2.527	3.008

[1] Shortage in supply of water available in river, Aug. 8 to Oct. 23, 1915.

SETTLEMENT AND DEVELOPMENT.

Reclamation of new lands was confined largely to the newly opened areas of Snipes Mountain, Outlook, and Sunnyside (Benton extension) irrigation districts. In the Outlook district more than 2,000 acres of the total irrigable area of 4,500 acres were planted to crops. The excellent results obtained on these units are due in part to the fact that

the settlers come principally from the adjacent irrigated areas and in part to the excellent quality of the land. Young men from families under the gravity unit were quick to take advantage of the opportunity to get good land in their home neighborhood at reasonable prices. The rapid development of these units has been hastened by reason of their form of organization—namely, the irrigation district. Under this plan of organization impartial enforcement of collection against all lands of accrued construction and maintenance charges operates as a check upon speculation. Under the gravity unit several thousand acres of land for which water is available and for which public notice has been issued are still desert, the owners holding the land for higher prices without being required to pay anything toward the construction or operation of the system. Under the irrigation district plan the incentive to speculation is largely removed by the certainty of a substantial district tax each year, and as a result lands of nonresidents or nonfarmers within the irrigation districts have been offered for sale at from $30 to $50 per acre—prices low enough to be very attractive to bona fide settlers. There is a noticeable tendency throughout the project toward slightly larger farms. The average size reported in the Outlook, Sunnyside (Benton), and Snipes Mountain districts is 43, 52, and 33 acres, respectively, as compared to an average for several years of about 23 acres for the gravity portion of the project.

Practically no new orchards have been planted, and some 2,000 acres of trees have been rooted up, either because they were planted on land not adapted to orchard purposes or on account of poor varieties or being peach trees planted as fillers in apple orchards. The low average return per acre from apple orchards indicates that there is still a large area planted to apple trees which could be more profitably devoted to other purposes. The high prices received for grain and forage crops have resulted in the culling of poor cows from dairy herds and in eliminating a small number of farmers from this usually profitable phase of farming; but, on the whole, the dairy industry has grown and the prices received for dairy products have been high enough so that the well-managed herd has been profitable. The cooperative creamery at Sunnyside had the best year in its history, and the newly organized cooperative creamery at Prosser also made a good showing. Many dairymen from the great dairying district of Puget Sound are being forced by the very high cost of hay to consider a change of location, and some have purchased lands within the project.

Through the efforts of the project manager the Yakima Commercial Club was induced early in the year to undertake to secure a beet-sugar factory for the valley, and finally the Utah-Idaho Sugar Co. agreed to build a factory provided 6,500 acres of beets could be pledged for its support. The securing of these pledges was a difficult task, as the farmers were mostly unfamiliar with beet culture and the current high prices for hay and potatoes made the prospective profits from beets seem small by comparison. The acreage was secured after strenuous effort on the part of the business men of all of the valley towns, and work on the factory is now well under way.

The good-roads program for Yakima and Benton Counties was pursued and a considerable mileage of hard-surfaced roads added during the year. Through the cooperation of other counties and the State highway department an excellent road is now open from the Columbia River, throughout the entire length of the Yakima Valley, past the

storage works at the headwaters of the Yakima River, and over the Cascade Mountains to the cities of Puget Sound. This road is fast becoming a popular highway for tourist travel.

The stock census indicates that the marked tendency toward dairying and stock raising which had prevailed the past few years has been checked, temporarily at least, by the prevailing high prices for hay, grain, and forage. The number of horses, cattle, sheep, and poultry remains approximately the same at a somewhat better valuation, especially with regard to sheep. The only item showing a material change is the number of hogs, showing a loss of approximately 40 per cent, almost offset, however, so far as values are concerned, by the material increase in unit price. The continued high price of hay again operated to reduce the number of "feeders" on the project, and this year there were being fed only 178 head of horses and mules, 733 head of cattle, 525 head of hogs, and 40,413 sheep.

Settlement data, Sunnyside unit, Yakima project.

Item.	1914	1915	1916	1917
Total number of farms on project	2,448	2,450	2,553	2,682
Population	6,900	7,270	7,844	8,000
Number of irrigated farms	2,448	2,450	2,553	2,682
Operated by owners or managers	1,912	1,910	1,898	1,744
Operated by tenants	536	540	655	938
Population	6,900	7,270	7,844	8,000
Number of towns	13	13	13	13
Population	5,300	5,460	5,268	5,350
Total population of towns and on farms	12,200	12,730	13,112	13,350
Number of public schools	34	34	34	35
Number of churches	30	30	30	30
Number of banks	9	9	9	9
Total capital stock	$260,000	$255,000	$309,573	$245,000
Total amount of deposits	$1,248,000	$1,028,679	$1,112,296	$1,896,341
Total number of depositors	3,000	5,848	5,674	6,640

PRINCIPAL CROPS.

The principal crops grown are fruits, grain, forage, and vegetables, of which potatoes rank first, although cabbage, asparagus, tomatoes, egg plants, onions, and other garden products are being planted in increasing quantities.

Weather conditions throughout the entire season of 1916 were never very favorable for growing crops. The backward, cool spring, coupled with late frosts and the almost constant wind, made all spring work very discouraging, especially the seeding of alfalfa, and made necessary the replanting of corn, potatoes, and garden truck as often as the second and third time. The replanting saved the alfalfa seeding, corn, and potatoes, and the average yield obtained from the crops grown on the larger portion of the project was about normal as compared with the results of the past four years.

Alfalfa continues to be the largest crop in acreage grown and in gross value of return to the grower. The first cutting was somewhat later and lighter than normal, the second cutting was exceptionally good, both in yield and quality, and the third was about average, the average yield per acre for the season being 4.8 tons. In spite of the large area planted to potatoes and corn, and because of the excellent prices received for alfalfa the preceding year, the newly seeded area in 1916 was greater than in any one season for some

years past, the increase in area planted to alfalfa and new seeding being 18 per cent as compared with 1915. The average return of $52.80 per acre is the best in years. The area in pasture in 1916 shows a gradual and steady increase as compared with preceding years. The area planted to potatoes shows a slight decrease as compared with 1915, with an average yield somewhat better than normal and a return per acre much better than in the past five years. Corn shows a material increase in area, with a yield not so good as in 1915 because of the cool summer and short growing season, but because of the good prices realized the average return of $38.40 per acre is above the average. The total of 9,363 acres planted to corn represents an increase of approximately 15 per cent as compared with 1915. The yield of soft fruits of all kinds was excellent and the prices optained were exceptionally good. The yield of apples was above the average and the prices realized were such as to return a good margin of profit to the grower, so that on the whole the orchard outlook at the close of 1916 is better than at any time in the past four years.

The total return of $4,341,940 is the greatest in the history of the project. Of this total return 32 per cent is from fruit, and the balance from hay, grain, and vegetables. The returns from fruit represented 27 per cent of the total in 1915 and 39.5 per cent in 1914. The average return of $73 per acre is the highest obtained in the past five years, and is 45 per cent greater than the average return per acre in 1915.

Crop report, Sunnyside Unit, Yakima project, Washington, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa	28,316	Ton	135,917	4.8	$11.00	$1,495,087	$52.80
Apples	11,315	Pound	51,202,650	4,525	.018	921,648	81.45
Barley	763	Bushel	25,001	33	.80	20,001	26.20
Beans	85	do	1,950	23	3.64	7,098	83.50
Clover hay	82	Ton	164	2	12.00	1,968	24.00
Corn	8,155	Bushel	390,867	48	.80	312,694	38.40
Corn ensilage	1,208	Ton	14,496	12	5.60	81,177	67.20
Corn fodder	780	do	5,460	7	5.00	27,300	35.00
Fruits, citrus	117	Acre				11,319	95.11
Fruits, small	355	do				36,210	102.00
Garden	951	do				95,100	100.00
Hay, except above	2,501	Ton	5,002	2	10.00	50,020	20.00
Hops	164	Pound	340,150	2,074	.11	37,416	228.14
Oats	98	Bushel	3,920	40	.60	2,352	24.10
Pasture	3,705	Acre				55,575	15.00
Peaches	884	Pound	5,850,280	6,618	.0225	131,631	148.90
Pears	1,353	do	9,799,200	7,317	.024	235,402	174.00
Prunes	238	do	2,298,825	9,659	.028	64,367	270.45
Potatoes	3,774	Bushel	841,600	223	.87	732,192	194.00
Wheat	1,013	do	20,260	20	1.15	23,383	23.00
Less duplicated areas	6,410						
Total cropped acreage	59,449						
Total and average						4,341,940	73.04

		Areas.	Acres.	Farms.	Per cent of project.
Irrigated, no crops:					
Young orchard	2,267				
Young alfalfa	3,371	Total irrigable area farms reported	73,000	2,682	65.87
Irrigated without crop	6,207	Total irrigated area farms reported	73,000	2,682	65.87
Town and building sites	4,142	Under water-right applications	26,198	912	23.64
Less duplicated areas	2,436	Under rental contracts	46,802	1,770	42.23
Total irrigated acreage	73,000	Total cropped area farms reported	59,449	2,682	53.64

TIETON UNIT.

CONSTRUCTION DURING FISCAL YEAR.

Tieton Canal.—In the fall of 1916 there were 126 stations of the upper end of the Tieton main canal raised 1 foot by placing a 1-foot concrete sideboard on top of the original canal. This involved the placing of 433 cubic yards of concrete and increased the capacity of this section about 50 second-feet. This work was all done by Government forces during October and November.

OPERATION AND MAINTENANCE.

The amount of land being irrigated at the end of the fiscal year is 25,000 acres. This represents about 80 per cent of the irrigable land under the project. Water deliveries are made on a strict rotation basis over the entire project. Two schedules are in use owing to the varied soil conditions; about 11,000 acres are on a schedule of 7 days on and 14 days off, and the remaining 14,000 acres on a schedule of 7 days on and 7 days off. Deliveries are made on the basis of 1 second-foot continuous flow to 140 acres. The above schedules have been used for three seasons and are considered satisfactory by the farmers. There are 10 patrol districts, each covering about 2,500 acres, and all deliveries are made by the patrolman as a rule in the forenoon, with no Saturday or Sunday deliveries. The season of 1916 was marked by a heavy run-off, and there was consequently ample water available. No serious interruptions were caused by storms or canal breaks and the entire system was operated successfully throughout the season.

Maintenance work during the fall of 1916 consisted of the necessary cleaning of the main laterals over various parts of the project. During the spring of 1917 the Government agreed to maintain the sublateral system and a large amount of cleaning and repairs were necessary prior to the opening of the irrigation season of 1917. There was also a large amount of repairs and renewal of structures on main laterals.

Historical review, Tieton unit. Yakima project.

Item.	1912	1913	1914	1915	1916	1917 [1]
Acreage for which service was prepared to supply water	34,000	34,000	34,000	34,000	30,000	34,000
Acreage irrigated	15,000	18,750	20,600	22,000	23,000	26,000
Miles of canal operated	260	335	335	335	335	335
Water diverted (acre-feet)	47,675	59,500	67,790	62,000	74,936	80,000
Water served to land (acre-feet)	34,445	42,539	43,099	40,376	49,412	56,000
Per acre of land irrigated (acre-feet)	2.27	2.27	2.09	1.83	2.15	2.10

[1] Estimated.

SETTLEMENT.

The general development of the project during the past year has been greater than in any one season since the opening of the project. Good market conditions together with favorable crop returns have brought about a better financial condition among the farmers, and a large amount of new development work has been going on continuously. There is a large increase in the actual number of settlers on the land and in the amount of new land being developed. The stock industry over the project is being well established on a permanent basis. A new cheese factory has been established; there is a large

amount of development in the way of new telephone lines and new county roads; and in general the project shows very rapid progress. The land is becoming more productive, and in general the farmers are becoming more prosperous.

Settlement data, Tieton unit, Yakima project.

Item.	1913	1914	1915	1916	1917
Total number of farms on project	900	1,000	1,200	1,300	1,400
Population	1,622	1,916	2,500	2,800	3,000
Number of irrigated farms	900	1,000	1,200	1,300	1,400
Population	1,622	1,916	2,500	2,300	3,000
Number of towns (on and adjacent to project)	7	7	7	7	7
Population	15,300	18,000	20,000	21,000	24,000
Total population in towns and on farms	16,922	19,916	22,500	23,800	27,000
Number of public schools	9	10	10	10	10
Number of churches	3	3	3	3	3

PRINCIPAL CROPS.

The principal crops to be disposed of this season are alfalfa, hay, corn, wheat, oats, barley, potatoes, beans, sugar beets, hops, garden truck, and all kinds of fruit, principally apples, peaches, pears, and cherries. Other crops comprise such as are either used up on the farm or supplied to local markets, and include pasture land, grain, hay, garden truck, vegetables, and small fruits.

The 1916 crop report shows very profitable returns to the farmers, due both to the yield and to the favorable market condition.

Crop report, Tieton unit, Yakima project, Washington, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yield.		Value.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay	8,425	Ton	27,223	3¼	$10.50	$285,841	$34.00
Apples	3,109	Pound	12,162,250	400	.02	243,245	78.00
Barley	884	Bushel	27,300	31	.85	23,205	26.00
Beans	168	do	2,240	13	3.60	8,064	48.00
Beets	4	Ton	52	13	8.00	416	104.00
Carrots	13	do	103	8	10.00	1,030	80.00
Clover hay	335	do	618	2	10.00	6,180	18.50
Clover seed	116	Bushel	195	1½	12.00	2,340	20.00
Indian corn	1,155	do	54,460	47	.85	46,291	40.00
Corn fodder	403	Ton	2,013	5	4.00	8,052	20.00
Small fruits	20	Pound	34,550	1,727	.08	2,764	138.00
Garden	256					25,600	100.00
Grain and timothy hay	1,042	Ton	1,675	1½	9.00	15,075	14.50
Hops	346	Pound	560,000	1,600	.10	56,000	160.00
Oats	1,283	Bushel	69,310	54	.45	31,189	24.00
Onions	29	do	4,160	140	1.75	7,280	250.00
Pasture	1,060					21,200	20.00
Peaches	383	Pound	2,147,500	5,600	.02	42,950	112.00
Pears	680	do	1,512,000	2,210	.03	45,360	67.00
Peas	3	Bushel	6	2	6.00	36	12.00
Prunes	4	Pound	3,050	760	.04	122	30.50
Potatoes	1,350	Bushel	196,500	145	.75	147,375	109.00
Wheat	2,522	do	69,100	27	1.20	82,920	32.00
Total	23,590						
Less duplicated areas	2,590						
Total cropped acreage	21,000	Total and average				1,102,536	52.50

		Areas.	Acres.	Farms.	Per cent of project.
Irrigated, no crop:					
Nonbearing orchard	3,645				
Young alfalfa	1,234				
Ground fall plowed	129	Total irrigable area farms reported	26,310	1,100	79
Miscellaneous	200	Total irrigated area farms reported		1,100	69
Less duplicated areas	3,208	Under water-right applications	23,000		
Total irrigated acreage	23,000	Total cropped area farms reported	21,000	1,000	63

PUBLIC NOTICES AND ORDERS.

PUBLIC NOTICE, MARCH 17, 1917.

1. *Annual operation and maintenance charges.*—In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat. 388), and of acts amendatory thereof and supplementary thereto, and particularly of the reclamation extension act of August 13, 1914 (38 Stat. 686), announcement is hereby made that the annual operation and maintenance charges for the irrigation season of 1917 and thereafter until further notice against all lands of the Tieton unit, Yakima project, Washington, under public notice, shall be as follows: A minimum charge of $1 per irrigable acre, whether water is used thereon or not, which will permit the delivery of not to exceed 1 acre-foot of water per irrigable acre and 75 cents per acre-foot for all additional quantities. All operation and maintenance charges will be due and payable on March 1 of each year for the preceding irrigation season.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

PUBLIC NOTICE, MAY 16, 1917.

1. In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat. 388), and of acts amendatory thereof and supplementary thereto, and particularly of the reclamation extension act of August 13, 1914 (38 Stat. 686), announcement is hereby made that the annual operation and maintenance charges for the irrigation season of 1917 and thereafter until further notice against all lands of the Sunnyside unit, Yakima project, Washington, under public notice, shall be as hereinafter stated.

2. *Classification of lands.*—For the purpose of equitably determining the operation and maintenance charges, the lands of the project shall as soon as possible be divided by the Sunnyside Water Users' Association, or the Sunnyside Valley irrigation district (and if said association and district fail so to do within a reasonable time, then by the project manager) into three classes, according to the duty of water thereon, viz, (A), (B), and (C); and a map showing such classification shall be filed in the office of the project manager.

3. *Operation and maintenance charges.*—Each acre of irrigable land, whether water is used thereon or not, shall be charged with a minimum operation and maintenance charge of 80 cents, which will permit delivery of not more than the following amounts per irrigable acre: To lands of Class (A), 2 acre-feet; to lands of Class (B), 2½ acre-feet; to lands of Class (C), 3 acre-feet. For additional water above the foregoing amounts the rates shall be 25 cents per irrigable acre for the first additional acre-foot and 60 cents per irrigable acre for the second additional acre-foot. Should a further supply be needed it will be delivered for 80 cents per acre-foot: *Provided*, That for newly reclaimed lands, no charge will be made for water actually needed in excess of the amount covered by a charge of $1.50 per irrigable acre at the said rates.

4. *Time of payment.*—All operation and maintenance charges are due and payable annually on March 1 following the irrigation season; but where water-right application is made for public land entered

under the reclamation law after June 15 in any year, or where water-right application is made after August 1 in any year for land in private ownership, no operation and maintenance charge will be made for water delivered during the remainder of the irrigation season in which the water-right application is made.

ALEXANDER T. VOGELSANG,
First Assistant Secretary.

FINANCIAL STATEMENT.

[Financial statement in detail showing assets, liabilities, reserves, and capital, given in appendix, p. 524.]

Feature costs of Yakima-Storage project to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examinations and surveys:		
Clealum		$33,141.56
Tieton Reservoir		20,564.98
Reservoir reconnoissance		2,927.92
Hydrographic surveys		5,460.48
Hydrographic investigations		29,303.43
High line		2,700.12
		94,098.49
Storage system:		
Preliminary and general work—		
Kachess	$4,266.47	25,044.60
Keechelus	6,471.91	124,036.44
Clealum	22,317.03	127,053.17
Tieton Reservoir	22,554.80	22,554.80
Dam—		
Kachess		427,112.94
Keechelus	251,695.19	1,227,887.72
Spillway—		
Kachess	30.95	35,656.58
Keechelus	82,062.24	123,236.41
Tunnels—Keechelus	1,625.00	120,861.01
Bridges—Keechelus	7,823.55	7,823.55
Clearing and logging reservoir area—		
Kachess	[1] 1,410.79	187,200.48
Keechelus	106,580.91	114,565.86
	504,017.26	2,543,733.56
Permanent improvements:		
Buildings—		
Kachess		2,667.90
Keechelus		2,553.39
Roads—		
Kachess	59.90	59.90
Keechelus	3,357.68	16,569.03
Tieton Reservoir	25,291.07	42,340.20
Bridges—		
Keechelus	3,801.05	3,801.05
Tieton Reservoir	4,890.77	4,890.77
	37,400.47	72,882.24
Telephone system—telephone lines:		
Kachess		1,008.07
Keechelus	231.71	2,661.29
Tieton Reservoir	783.04	783.04
	1,014.75	4,452.40
Operation and maintenance during construction (water-rental basis)	1,591.52	9,899.36
Plant accounts	68,032.83	129,575.22
Undistributed clearing accounts	18,953.75	18,953.75
Gross construction cost of project to June 30, 1917	631,010.58	2,873,595.02

[1] Deduct.

Feature costs of Yakima-Storage project to June 30, 1917—Continued.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Less revenues earned during construction period:		
Rental of buildings	$5,522.78	$26,869.70
Rental of grazing and farming lands		51.00
Rental of power and light	380.66	1,766.13
Rental of irrigation water	[1] 10,000.00	4,305.00
Rental of telephone and tolls	11.40	34.20
Other revenues, unclassified	26,890.82	67,345.77
Profit on mess-house operations	[1] 8,023.24	33,040.64
Profit on mercantile store operations	3,505.34	16,168.97
Profit on hospital operations	758.38	2,065.32
	19,046.14	151,646.73
Net cost of construction of project		2,721,948.29

[1] Deduct.

Statement of costs by fiscal years, Yakima-Storage project.

Year ending June 30—	Construction.	Operation and maintenance during construction.	Total cost.
1910	$443,807.26		$443,807.26
1911	337,361.17		337,361.17
1912	[1] 214,039.11		[1] 214,039.11
1913	284,545.65		284,545.65
1914	446,695.02		446,695.02
1915	500,188.76	$991.15	501,179.91
1916	374,175.46	7,316.69	381,492.15
1917	629,419.06	1,591.52	631,010.58
Plant and undistributed clearing accounts to June 30, 1916	61,542.39		61,542.39
Total	2,863,695.66	9,899.36	2,873,595.02

[1] Deduct.

NOTE.—Apparent decrease in 1912 due to the transfer of Bumping Lake construction costs to the Yakima-Tieton project.

Estimated cost of contemplated work, Yakima-Storage project, during fiscal year 1918.

Features.	Estimated cost during fiscal year 1918.	
	Subfeature.	Principal feature.
Examinations and surveys: Pleasant Valley investigations		$3,000.00
Storage works:		
Keechelus Lake—		
Preliminary and general work	$2,300.00	
Dam	25,040.00	
Clearing and logging	110,190.00	
Tieton Reservoir—		
Preliminary and general work	14,620.00	
Dam	88,325.00	
Tunnels	240,050.00	
Clearing and logging	19,475.00	
		500,000.00
Permanent improvements, Tieton Reservoir: Roads		26,000.00
Telephone system, Tieton Reservoir: Telephone lines		400.00
Stores and other operations		1,500.00
Total		530,900.00

SUNNYSIDE UNIT.

Feature costs of Yakima-Sunnyside project to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and survey	$10,272.65	$56,362.84
Pumping for irrigation:		
Snipes Mount irrigation district	5,521.65	54,671.08
Outlook irrigation district	9,206.68	92,786.85
Grandview irrigation district	71,454.56	76,512.55
	86,182.89	223,970.48
Canal system: Main Canal	10,431.73	1,692,043.95
Lateral system:		
General; Gravity system	27,560.14	727,141.82
Sunnyside irrigation district	1,889.14	108,772.57
Snipes Mount irrigation district	35.19	35,514.99
Outlook irrigation district	4,155.25	108,034.95
Grandview irrigation district	72,990.54	80,749.11
	106,630.26	1,060,213.44
Drainage system: Investigation		11,418.80
Farm units	449.24	22,462.15
Permanent improvements: Buildings and grounds		36,128.55
Telephone system		22,412.57
Operation and maintenance during construction	[1] 7,584.70	
Plant accounts	1,016.69	9,983.89
Operation and maintenance charges transferred to and compounded with construction charges	3,173.52	13,887.77
Supplemental construction		2,606.40
Gross construction cost to June 30, 1917	210,572.28	3,151,490.84
Less revenue earned during construction period:		
Rental of buildings	663.42	3,924.09
Contractors' freight refunds	801.51	10,959.63
Forfeitures by defaulting bidders and contractors		5,391.16
Profit on mess-house operations	[1] 1,165.15	2,602.86
Profit on mercantile store operations		2,917.75
Profit on hospital operations	434.33	1,409.31
Total revenues	734.11	27,204.80
Net cost of construction of project to June 30, 1917		3,124,286.04

[1] Deduct.

Statement of costs by calendar years, Yakima-Sunnyside project.

Year ending December 31—	Construction.	Operation and maintenance under public notice.	Total cost.
1907	$550,161.00	$45,438.41	$595,599.41
1908	244,100.05	47,592.06	291,692.11
1909	174,339.32	49,997.52	224,336.84
1910	642,867.08	82,223.95	725,091.03
1911	604,636.56	83,252.51	687,889.07
1912	153,779.92	86,480.45	240,260.37
1913	14,806.80	83,958.92	98,765.72
1914	87,471.24	78,709.20	166,180.44
1915	398,278.84	76,075.81	474,354.65
1916	133,273.75	74,647.80	207,921.55
Jan. to June 30, 1917	135,185.99	41,797.64	176,983.63
Supplemental construction	2,606.40		2,606.40
Plant accounts	9,983.89		9,983.89
Total	3,151,490.84	750,174.27	3,901,665.11

NOTE.—In the above statement costs are affected by operation and maintenance charges transferred to construction cost, as follows: 1915, $9,211.16; 1916, $2,636.69; 1917, $2,039.92; total, $13,887.77.

Statement of costs by fiscal years, Yakima-Sunnyside project.

Year ending June 30	Construction.	Operation and maintenance under public notice.	Total cost.
1907	$284,355.48	$30,971.13	$315,326.61
1908	237,327.31	49,221.16	286,548.47
1909	289,040.64	49,453.67	338,494.31
1910	550,533.44	64,811.50	615,344.94
1911	597,597.57	86,437.82	684,035.39
1912	385,810.24	95,541.15	481,351.39
1913	38,163.16	66,256.68	104,419.84
1914	13,720.41	89,111.28	102,831.69
1915	367,830.51	66,036.05	433,866.56
1916	164,966.20	68,353.60	233,319.80
1917	210,572.28	83,980.23	294,552.51
Supplemental construction	2,606.40		2,606.40
Plant accounts	8,967.20		8,967.20
Total	3,151,490.84	750,174.27	3,905,661.11

NOTE.—In the above statement costs are affected by operation and maintenance charges transferred to construction cost, as follows: 1915, $8,148.46; 1916, $2,565.79; 1917, $3,173.52; total, $13,887.77.

Estimated cost of contemplated work, Yakima-Sunnyside project, during fiscal year 1918

Features.	Estimated cost during fiscal year 1918.	
	Subfeature.	Principal feature.
Examination and survey: Kennewick extension		$5,000.00
Pumping for irrigation:		
Outlook irrigation district	$1,000.00	
Grandview irrigation district	13,000.00	
Prosser irrigation district	75,000.00	
Granger irrigation district	55,000.00	
		144,000.00
Lateral system:		
Grandview irrigation district	2,000.00	
Prosser irrigation district	46,000.00	
Granger irrigation district	36,000.00	
		84,000.00
Operation and maintenance under public notice		110,000.00
Stores and other operations		3,500.00
Plant and equipment		5,500.00
Total		352,000.00

Feature costs of Yakima-Tieton project, June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and survey		$69,694.56
Storage works:		
Bumping Lake Dam		550,837.42
Clear Creek Dam		84,542.78
		635,380.20
Canal system:		
Headworks		14,937.15
Tunnels		397,100.73
Main Canal	$24,805.12	666,547.66
Wasteways		57,181.22
Culverts and drains		22,453.97
	24,805.12	1,158,220.73

Feature costs of Yakima-Tieton project to June 30, 1917—Continued.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Lateral system:		
Headworks and diversion dams		$26,958.20
Laterals and sublaterals		864,724.01
Flumes		108,390.45
Bridges		5,562.36
Drops, chutes, checks, and turnouts		77,442.46
Siphons		14,175.95
Wasteways		11,067.21
Culverts and drains		54,226.07
		1,162,546.71
Permanent improvements:		
Buildings and grounds		41,943.95
Roads		59,573.55
Real estate		2,768.60
		104,286.10
Telephone system		25,148.78
Operation and maintenance during construction		10,208.54
Operation and maintenance transferred to and compounded with construction charges	$5,837.47	34,788.44
Gross construction cost to June 30, 1917	30,642.59	3,200,274.06
Less revenue earned during construction period:		
Rental of buildings		4,827.35
Rental of irrigating water		3,526.50
Contractors' freight refunds		5,092.12
Other revenues, unclassified	1,522.11	1,522.11
Profit, mess-house operations	[1] 23.96	[1] 1,155.75
Profit, mercantile-store operations		9,992.83
Profit, hospital operations	309.55	2,495.49
	1,807.70	26,300.65
Net cost of constructing project to June 30, 1917		3,173,973.41

[1] Deduct.

Statement of costs, by calendar years, Yakima-Tieton project.

Year ending Dec. 31—	Construction.	Operation and maintenance.			Total cost.
		During construction.	Under public notice.	Total operation and maintenance.	
1907	$174,725.75				$174,725.75
1908	478,025.00				478,025.00
1909	631,275.00				631,275.00
1910	587,278.00	$10,208.54		$10,208.54	597,486.54
1911	928,785.63		$22,003.53	22,003.53	950,789.16
1912	220,689.90		39,355.11	39,355.11	260,045.01
1913	22,395.00		43,857.57	43,857.57	66,252.57
1914	77,103.34		41,174.81	41,174.81	118,278.15
1915	38,776.09		7,159.66	7,159.66	45,935.75
1916	25,005.94		36,335.43	36,335.43	61,341.37
Jan. to June 30, 1917	6,005.87		20,949.53	20,949.53	26,955.40
Total to June 30, 1917	3,190,065.52	10,208.54	210,835.64	221,044.18	3,411,109.70

NOTE.—In the above statement costs are affected by operation and maintenance charges transferred to construction cost as follows: 1915, $27,866.34; 1916, $2,279.08; 1917, $4,643.02; total, $34,788.44.

Statement of costs, by fiscal years, Yakima-Tieton project.

Year ending June 30—	Construction.	Operation and maintenance.			Total cost.
		During construction.	Under public notice.	Total operation and maintenance.	
1907	$177,018.59				$177,018.59
1908	478,256.92				478,256.92
1909	631,056.66				631,056.66
1910	584,647.91	$10,208.54		$10,208.54	594,856.45
1911	906,776.57		$16,093.92	16,093.92	922,870.49
1912	218,372.47		26,447.16	26,447.16	244,819.63
1913	22,032.06		41,215.75	41,215.75	63,247.81
1914	36,817.09		40,966.73	40,966.73	77,783.82
1915	88,959.11		19,643.62	19,643.62	108,602.73
1916	15,485.55		28,183.90	28,183.90	43,669.45
1917	30,642.59		38,284.56	38,284.56	68,927.15
Total to June 30, 1917	3,190,065.52	10,208.54	210,835.64	221,044.18	3,411,109.70

NOTE.—In the above statement costs are affected by operation and maintenance charges transfered to construction cost as follows: 1915, $16,932.44; 1916, $12,018.53; 1917, $5,837.47; total, $34,788.44.

Estimated cost of contemplated work, Yakima-Tieton project, during fiscal year 1918.

Features.	Principal feature.
Canal system: Raising sides, Main Canal	$20,000.00
Lateral systems: Concrete lining to check seepage losses	9,000.00
Operation and maintenance under public notice	54,000.00
Stores and other operations	1,000.00
Plant and equipment	3,000.00
Total	87,000.00

WYOMING, SHOSHONE PROJECT.

GEORGE O. SANFORD, project manager, Powell, Wyo.

LOCATION.

Counties: Park and Big Horn.
Townships: 52 to 58 N., Rs. 97 to 104 W., sixth principal meridian.
Railroad: Chicago, Burlington & Quincy.
Railroad stations and estimated population January 1, 1917: Cody, 1,035; [1] Corbett; Deaver, 100; [2] Ralston; Powell, 550; Garland, 50; [1] Mantua; and [1] Frannie, Wyo.

WATER SUPPLY.

Source of water supply: Shoshone River.
Area of drainage basin: 1,380 square miles.
Annual run-off in acre-feet: Shoshone River near Cody (1,380 square miles), 1903-1916—maximum, 1,420,000; minimum, 846,372; mean, 1,134,012.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which service is prepared to deliver water, season 1917: 43,265 acres.
Works constructed for fifth unit, not open to entry: 13,000 acres.
Area under water-right applications, season of 1917: 38,974 acres.
Area under rental contract, season 1917: 2,650 acres.
Length of irrigating season: From April 10 to November 1.
Average elevation of irrigable area: 4,500 feet above sea level.
Rainfall on irrigable area: 1907–1916, average, 5.88 inches. 1916, 4.70 inches.
Range of temperature on irrigable area: −31° to 101° F.
Character of soil of irrigable area: Light sandy and clay loams.
Principal products: Alfalfa, grain, sugar beets, vegetables, cattle, hogs, and dairy products.
Principal markets: Omaha, Nebr.; Kansas City, Mo.; Chicago, Ill.; Denver, Colo.; Billings, Mont.; and local.

LANDS OPENED FOR IRRIGATION.

Dates of public notices and orders relating thereto: February 10, 1917; March 9, 1917.
Location of lands opened: Tps. 54 to 56 N., Rs. 98 to 100 W., sixth principal meridian.
Present status of irrigable lands opened: 38,149 acres of public and 825 acres of private lands under water-right application, 2,404 acres of unentered public land, and 1,885 acres of private and State land open to entry for which water is available, but for which no water-right application has been made, 3.54 acres of land included in United States reserves.
Limit of area of farm units: Public, 80 acres; private, 160 acres.
Duty of water: 2 acre-feet per acre per annum at the farm.
Building charge per acre of irrigable land: $57 on first unit; $58 on second unit; $59 on third, fourth, and fifth units, charge for sixth unit not yet announced.
Annual operation and maintenance charge, 1917: 60 cents per acre of irrigable land whether water is used or not, for which 2 acre-feet of water may be delivered; 20 cents for the third acre-foot, and 50 cents per acre-foot for all additional water, subject to an additional charge of 15 cents per acre-foot for all water delivered from July 5 to August 4, both inclusive.

CHRONOLOGICAL SUMMARY.

Reconnoissance made and preliminary surveys begun in 1903.
Construction recommended by board of engineers, February 1, 1904.
Construction authorized by Secretary, February 10, 1904.
Corbett diversion dam completed June, 1907.
Corbett tunnel completed November, 1907.
First irrigation by Reclamation Service, season of 1908.
Shoshone Dam completed January, 1910.
Project 50 per cent completed June 30, 1917.

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[1] Railroad sidings only.
[2] Population less than 25.

IRRIGATION PLAN.

The irrigation plan of the Shoshone project provides for the storage of flood waters of Shoshone River in a reservoir controlled by Shoshone Dam, about 8 miles above Cody, Wyo.; the diversion of water from Shoshone River by a dam at Corbett, about 16 miles below the reservoir, and through the Corbett tunnel into a canal system supplying water to lands on the north side of the river in the vicinity of Ralston, Powell, Garland, Mantua, Frannie, and Deaver; the diversion into the Willwood Canal for the irrigation of lands on the south side of the Shoshone River; and the diversion into the north side High Line from the Shoshone Dam for the irrigation of lands lying on the north side of the Shoshone River above the Garland Canal system, and extending from the lower end of the Shoshone Canyon near Cody to the divide between the Shoshone River and Clarks Fork drainage.

The United States claims all waste, seepage, spring, and percolating water arising within the project and proposes to use such water in connection therewith.

The Shoshone Dam, Corbett Dam, Corbett tunnel, Garland Canal, about 14 miles of the Frannie Canal, the lateral and distributory system for approximately 55,500 acres in the vicinity of Ralston, Powell, Garland, Mantua, and Deaver have been completed, and the major portion of a 20-mile extension of the Frannie Canal, and a start made on the construction of the lateral system, which will irrigate about 10,000 acres in the second unit of the Frannie division.

Future operations include the construction of the Willwood and High Line Canals and the completion of additional units in the Frannie division.

SUMMARY OF GENERAL DATA FOR SHOSHONE PROJECT TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is complete		147,326
Public land entered to end of fiscal year	38,269	
Public land open to entry at end of fiscal year	2,404	
Public land withdrawn at end of fiscal year	97,340	
State land	6,326	
Private land	2,987	
Acreage service could have supplied season of 1916		42,816
Estimated addition in fiscal year, 1918		13,000
Estimated acreage service can supply July 1, 1918		55,816
Acreage actually irrigated, season of 1916		29,977
Acreage cropped under irrigation, season of 1916		28,695
Crops:		
Value of irrigated crops, season of 1916		$600,903.00
Value of irrigated crops, per acre cropped		$20.94
Finances:		
Gross construction cost to end of fiscal year		$5,046,141.88
Per cent complete at end of fiscal year		50
Appropriated for fiscal year 1918, total		$252,000.00
Allotment for construction, fiscal year 1918		$297,000.00
Estimated per cent complete, June 30, 1918		54
Announced construction charges per acre		$57, $58, $59
Appropriation, fiscal year 1917		[1] $869,472.10
Expenditures during fiscal year, chargeable to 1917 appropriation—		
Disbursements	$330,046.71	
Transfers	28,260.04	
	$358,306.75	
Registered liabilities chargeable to 1917 appropriation	67,946.90	
Contract obligations wholly covered by 1917 appropriation	75,509.46	
Estimated engineering expenses on contract work wholly covered by 1917 appropriation	7,478.61	
		509,241.72
Unencumbered balance, July 1, 1917		360,230.38

[1] Includes balance of 1916 appropriation and refunds authorized to be added to 1917 appropriation by sundry civil act of July 1, 1916.

Repayments:		
Construction charges—		
Accrued to end of fiscal year		$297,900.51
Collected to end of fiscal year		293,996.59
Uncollected at end of fiscal year		3,903.92
Operation and maintenance charges (public notice)—		
Accrued to end of fiscal year		157,364.50
Collected to end of fiscal year		151,515.17
Uncollected at end of fiscal year		5,849.33
Water-rental charges—		
Accrued to end of fiscal year		3,331.78
Collected to end of fiscal year		2,222.26
Uncollected at end of fiscal year		1,109.52
Drainage:		
Estimated acreage damaged by seepage to end of fiscal year		5,000
Miles of drains built to end of fiscal year:		
Open	11.565	
Closed	67.90	
		79.465
Estimated acreage protected by drains built to end of fiscal year		14,000
Estimated acreage to be protected by authorized system		17,500
Cost of drainage works to end of fiscal year		$546,866.42

CONSTRUCTION DURING FISCAL YEAR.

Canal system, Frannie division.—All earthwork on the first unit, Frannie division, was completed by September 30, 1916. It was necessary to extend Frannie Canal in a northerly direction for a distance of about 20 miles in order to deliver water to the second unit, which includes the land located mostly on the westerly side of the Cody branch of the Chicago, Burlington & Quincy Railroad from Polecat Creek to Frannie. This work was advertised and proposals were opened August 18, 1916. Contract was awarded to Hoyt Hayden of Great Falls, Mont., for all four schedules. The lateral system was advertised and proposals opened March 15, 1917. The work was divided into four schedules and contracts were awarded as follows:

Schedule 1, H. S. Jolley, Lovell, Wyo.
Schedule 2, David Lewis, Cowley, Wyo.
Schedule 3, Tebbs & Taggart, Cowley, Wyo.
Schedule 4, N. O. Mortensen, Cowley, Wyo.

Schedule 1 covers the construction on lateral 67F, which is located at the easterly end of the Garland division and delivers water to about 900 acres of irrigable land directly north of Garland. Schedules 2, 3, and 4 cover the lateral system of the second unit, Frannie division.

Progress on the construction of Frannie Canal extension has been fairly satisfactory, but owing to adverse weather conditions in the fall of 1916 and the spring of 1917 an application was made for an extension of time on this contract which should have been completed May 31, 1917. Persons to whom contracts were awarded for the construction of the lateral system were engaged as subcontractors on

Frannie Canal extension, and at the close of the fiscal year practically no work had been started on the second unit laterals.

The structures included under schedule 1 of specifications No. 331 were constructed under formal contract by the Security Bridge Co. This work should have been completed November 30, 1916, but owing to unfavorable weather conditions in the late fall and early spring, and also owing to adverse labor conditions, an extension of time was granted to May 31, 1917, and the work was satisfactorily completed within the time granted by this extension.

Most of the balance of the concrete structures on the first unit were constructed by Government forces, but owing to the fact that it would be necessary to establish two additional construction camps, one in the northerly and one in the easterly portion of the project, it was deemed advisable to advertise the structures located within these areas and if satisfactory prices could be secured to award contracts therefor. Authority was granted to advertise the work locally; this was done and contract was awarded October 18, 1916, to Peter Shirts, of Garland, Wyo. The estimated value of the work is $13,059. Construction work was immediately started by the contractor, but owing to unfavorable weather conditions, beginning early in November, not much work was accomplished in the fall of 1916. The progress made by the contractor in the spring of 1917 has not been all that could be desired, and at the end of the fiscal year 8 per cent of the work was completed.

In order to hasten the completion of small structures in laterals near Mantua, authority was granted the project office to advertise locally about $2,000 worth of work; this was done and contract awarded to R. L. Stanley, of Deaver, Wyo. The contractor immediately began work and had practically completed all structures at the end of the fiscal year 1917.

Owing to difficulties experienced in securing satisfactory bids for the work covered by schedule 2 of specifications 331, authority was granted to construct this portion of the work by Government forces. The work has been continued throughout the fiscal year and on June 30 about 1 per cent of the work had been completed. Labor conditions have not been satisfactory and it has been necessary to increase rates of pay from 25 to 30 per cent, with a resulting decrease in efficiency. In addition there has been a very decided increase in the cost of all classes of material, and as a result the cost of the work will be in excess of the estimates. Immediately upon the completion of the structures of the first unit, Frannie division, Government forces will continue on the construction of the second unit structures.

Frannie tunnel.—On the Frannie Canal extension there is a short reach where there is no safe holding ground for an open canal, and after carefully considering all of the controlling conditions it was decided to construct a tunnel about 1,400 feet long, which, although increasing the first cost, would result in a very much lower maintenance cost and make it possible to give more satisfactory service to the lands located under this canal. Authority was granted to build this tunnel with Government forces and work was started on December 31, 1916. This action was based upon the fact that there was on the project practically all the equipment required for carrying on the work. A force was immediately organized and work pushed

rapidly throughout the winter months. The tunnel excavation was completed May 6, 1917. The tunnel passes through alternate layers of shale and sandstone, and for this reason a concrete lining is necessary, and through the shale sections a concrete arch will be required. Upon completion of the excavation, work was started on the concrete lining, and at the end of the fiscal year about 52 per cent of the work had been completed.

Shoshone Dam.—The only work carried on at Shoshone Dam during the fiscal year was the installation of a protected steel ladder, which will give access to the controlling works at all seasons of the year. Heretofore the ladder leading from the balcony on the lower face of the dam down to the operating chamber has been incased in ice from early in November until the latter part of May and it has usually been necessary to operate the controlling works by the last of April. The protected ladder consists of a riveted steel pipe 32 inches in diameter fastened to the face of the dam and made water tight. Although the lower portions will be incased in ice during the winter months, it will still be possible to go through the pipe to the operating chamber.

Plans have been prepared for the construction of suitable log buildings at Shoshone Dam, and at the end of the fiscal year contract had been awarded for cutting and hauling suitable house logs from the Shoshone National Forest Reserve to the location of the buildings. The deep snow in that portion of the mountains where good house logs could be secured made it impossible to accomplish anything until after the first of July.

SEEPAGE AND DRAINAGE.

During the fiscal year the construction of drainage works was continued with the drag-line excavator and the Austin trencher, and a total of 12.85 miles of closed tile and 1.25 miles of open drains were constructed. As a result most of the large areas affected by seepage have been reclaimed and protected. It is, however, impossible to state when the end of drainage work will be reached. Thus far it has been the general rule that as fast as one area has been cleaned up other seeped areas begin to appear. With the exception of a few small tracts the land in the Garland division south of Bitter Creek is well protected, but observations of the ground water plane show that it will be necessary to construct additional drains in the westerly portion of this area. In addition to the area south of Bitter Creek there is now definite indication that it will be necessary to construct extensive drainage works in the northwesterly portion of the Garland division. This portion of the project has a somewhat heavier soil without the underlying gravel which is found in the area south of Bitter Creek. Portions of this land have been irrigated for six and seven years and have remained in a productive condition. Investigations made during the spring and early summer of 1917 show a relatively high water plane over a rather large area, indicating clearly that it will be necessary to construct drainage works if the land is to be maintained in a productive state.

In the spring of 1915 the water users voted favorably on an increased charge of $7 per acre to carry on drainage work. The funds made available by this increased charge have been sufficient

to continue drainage work throughout the fiscal year 1917 and the greater portion of 1918, but if drainage work is to be continued after that time some provision will have to be made for advancing necessary funds.

ECONOMIES OF GOVERNMENT WORK.

An excellent showing was made on the construction of drainage work throughout the first portion of the fiscal year, and on December 31, 1916, the average cost of closed tile drain was $1.21, as compared with $1.32 at the end of the calendar year 1915. The work which has been carried on during the calendar year 1917 has shown an increased cost, due to the necessity of paying materially higher wages. This condition has also had an influence on all work carried on by Government forces, and under such conditions it is not possible to make a favorable comparison with construction costs of the past few years

OPERATION AND MAINTENANCE.

During the past fiscal year the canal system has been operated for the delivery of water for irrigation purposes to about 33,000 acres of crops in the Garland division and 2,300 acres in the Frannie division, besides water used for camp and construction purposes. Practically all the laterals and distributaries in the Garland division are delivering water to all the land tributary thereto, and with very few exceptions satisfactory service has been given. There are short periods of time when the demand is slightly in excess of the water that can safely be carried in some portions of the system. Thus far no regular schedule of rotation has been tried, but water is delivered on this basis, as it seldom happens that more than half of the unit holders are receiving water at any one time. Portions of the system will require some improvement before the full capacity of the canal can be safely carried. The principal source of complaint is in connection with waste water. The present regulations require that each unit holder shall construct a waste-water ditch to dispose of waste water into a natural drainage channel or some other waste ditch. There is no provision for enforcing this regulation, and as a result the lower reaches of waste-water ditches are inadequate in size and are not maintained in proper condition. As a result the disposition of waste water is in a decidedly unsatisfactory condition. Plans have been made by the Reclamation Service for returning to beneficial use a part of the waste water now running off the Garland division, but before this can be completed, considerable work must be done in enlarging the lower portion of some of the laterals so that the increased quantity of waste water which usually comes during the night hours can be disposed of safely at the lower end of the canals.

Deliveries of water during the fall of 1916 were discontinued from September 25 to October 25 in order to do necessary maintenance work. Deliveries were resumed and continued until November 10. The winter of 1916 and 1917 was severe, and considerable damage resulted to canals and structures. The late spring of 1917 made it difficult to do all necessary maintenance work before water was turned into the system, and as a result it has required continual effort on the part of the maintenance department to keep all portions

of the canal system in first-class operating condition. This work has been further handicapped by difficulty in securing necessary men and teams.

Historical review, Shoshone project.

Item.	1912	1913	1914	1915	1916	1917
Acreage for which service is prepared to supply water	41,332	41,309	41,168	42,816	42,623	43,265
Acreage irrigated	16,524	19,423	22,226	25,753	29,977	32,984
Number of farms irrigated	346	396	420	498	593	620
Miles of canal operated	242	242	245	247	266	286
Water diverted (acre-feet)	50,100	69,767	92,340	96,217	125,622	[1] 37,694
Water delivered to land (acre-feet)	27,370	40,436	52,789	54,668	70,247	[1] 19,466
Per acre of land irrigated (acre-feet)	1.66	2.08	2.38	2.12	2.34	[1] 0.60

[1] To June 30.

SETTLEMENT.

The year 1916 can truly be termed the banner year on Shoshone project both in crop production and crop value per acre, as well as in the growth of Powell, which has been substantial and permanent. During the year 116 lots in Powell town site were sold at an appraised value of $17,426, bringing the total receipts from town-lot sales to $87,891.50 on June 30, 1917. Building operations continue and several brick structures have been erected, notably a large addition to the Powell National Bank and a new theater. In the residential section improvements have been made in walks, setting out trees, and seeding lawns. On Bent Street, which is the principal street of the town, only four lots remain unsold, and in other sections of the town there is a good demand for additional lots. On January 29, 1917, the Great Western Sugar Co. purchased a factory site just west of the town limits, and, although no definite statement has been made relative to the erection of a factory, it is understood that this depends in a large measure on the acreage planted to beets.

Twenty-two original homestead entries, aggregating 1,600.73 acres of irrigable land, were made. Thirteen relinquishments, totaling 782.02 irrigable acres, were also made. Of these, 12 were immediately filed upon by others, who assumed the unpaid construction charges owing the Government. One unit, which contained soil of an inferior quality, was relinquished to the United States, and the entryman forfeited the charges paid. Forty-two farms, aggregating 2,415.04 acres, were sold by assignment at a price of about $100 per acre. A few sales were made at prices in excess of this amount, and when the charges due the Government have been paid the cost will amount to between $135 and $150 per acre. No units were canceled for nonpayment of charges, and no units are subject to cancellation because of nonpayment of charges.

Instructions were received from the Secretary to get every available acre of land that could be watered into crop, either by lease or by Government forces. On the Garland division 200 acres have been leased, the Government furnishing the land, seed, and water and receiving as its share one-third of the crop at the machine and paying its portion of the thrashing bill. On the Frannie division 2,075 acres have been leased on the same terms, and 225 acres are being farmed under the direction of the Reclamation Service.

It is expected that the lands under the first unit, Frannie division, will be opened to entry some time during September. Construction work is practically completed on this unit and most of the canals have been primed and some of the land is being irrigated. Good progress is being made on the second unit.

Excluding the farm units withdrawn from entry for the purpose of increasing crop production, there remain on the Garland division 12 farm units subject to homestead entry. These farms are not very attractive and will not be filed upon for some time to come. Inquiries are being received daily relative to available lands, and even with the opening of the lands under the first unit of the Frannie division there will not be enough land to meet the demand. In this office we have a mailing list of about 700 names of persons desiring to be advised as to the opening of the Frannie division, and the Burlington Railroad has several times this number. With only 184 farms in this unit there is every reason to believe that they will be taken as soon as opened to entry.

Settlement data, Shoshone project.

Item.	1912	1913	1914	1915	1916	1917
Total number of farms on project	612	615	616	609	650	646
Population	[1] 1,700	[1] 1,279	[1] 1,400	[1] 1,500	[1] 1,800	[1] 2,000
Number of irrigated farms	360	396	424	460	577	620
Operated by owners or managers		349	359	363	458	465
Operated by tenants		47	65	97	119	155
Population	[1] 1,700	[1] 1,279	[1] 1,400	[1] 1,500	[1] 1,800	[1] 2,000
Number of towns	3	3	3	3	4	4
Population	[1] 500	[1] 515	[1] 525	[1] 515	[1] 650	[1] 700
Total population on farms and in towns	[1] 2,200	[1] 1,794	[1] 1,925	[1] 2,015	[1] 2,450	[1] 2,700
Number of public schools	6	6	6	6	6	6
Number of churches	6	6	6	7	7	7
Number of banks	3	3	3	3	3	3
Total capital stock	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000
Total amount of deposits	$125,000	$146,000	$156,665	$177,228	$252,746	$361,000
Total number of depositors	800	850	1,037	1,290	1,500	1,875
Number of relinquishments	34	16	14	13	22	13

[1] Estimated.

PRINCIPAL CROPS.

The total crop value for the season of 1916 was $600,903, with an average value of $20.94 per acre, which is the highest in the history of the project. There were 29,977 acres of land irrigated, of which 28,695 acres were cultivated and cropped; 263 acres were in potatoes with a total value of $40,489.50, or an average value of $154.25 per acre. Sugar beets averaged $73.48 per acre, the total value being $65,013.30. Alfalfa continues to be the principal crop, and 13,006 acres were in this crop, with a total of $245,616, or an average of $18.88 per acre. The area in oats, wheat, and barley amounted to 11,992.25 acres, and the total value of grain crops produced amounted to $196,551.40.

Crop report, Shoshone project, Wyoming, year of 1916.

Crop.	Area (acres).	Unit of yield.	Yield.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay	13,006	Tons	30,702.00	2.36	$8.00	$245,616	$18.88
Alfalfa seed	162.5	Bushels	252.00	1.55	9.00	2,268	13.96
Apples	6.5	Pounds	2,255.00	346.92	.03	68	10.41
Barley	561	Bushels	10,783.00	19.20	.90	9,705	17.28
Beans	14	do	159.50	11.60	3.60	574	41.76
Beets, sugar	885	Tons	9,850.50	11.13	6.60	65,013	73.48
Clover hay	25	do	31.50	1.29	5.00	157	6.43
Clover seed	383	Bushels	1,009.00	2.64	9.00	9,081	23.74
Corn fodder	61	Tons	326.50	5.33	8.00	2,612	42.64
Fruits, small	1.50	Pounds	850.00	566.67	.15	127	85.00
Garden	175					16,605	94.89
Hay	325	Tons	252.00	.78	7.37	1,859	5.72
Millet seed	6	Bushels	24.00	4.00	4.00	96	16.00
Oats	8,544	do	223,359.50	26.14	.60	134,016	15.68
Pasture	1,382					19,686	14.24
Peas	1.50	Bushels	(1)	(1)	(1)	(1)	(1)
Potatoes, white	263	do	40,489.50	154.25	1.00	40,489	154.25
Rye	7	do	100.00	14.29	1.00	100	14.29
Wheat	2,886	do	52,831.00	18.30	1.00	52,831	18.30
Total cropped acreage	28,695	Total and average				600,903	20.94

		Areas.	Acres.	Farms.	Per cent of project.
Irrigated; no crop:					
Nonbearing orchard	173	Total irrigable area farms reported	37,130.73	593	25.2
Young alfalfa	2,379	Total irrigated area farms reported	29,977.00	593	20.3
Ground fall plowed	241	Under water-right applications	27,907.00	455	18.9
Miscellaneous	276	Under rental contracts	2,070.00	38	1.4
Less duplicated areas	1,787	Total cropped area farms reported	28,694.50	593	19.4
Total irrigated acreage	29,977				

[1] No yield.

PUBLIC NOTICES AND ORDERS.

PUBLIC NOTICE, FEBRUARY 10, 1917.

1. In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and of acts amendatory thereof and supplementary thereto, and particularly the reclamation extension act of August 13, 1914 (38 Stat., 686), and in pursuance of and supplementary to the provisions of the order of the Secretary of the Interior dated October 9, 1915, opening the fifth unit of the Shoshone project for entry, public notice for said unit is hereby issued, as follows:

2. *Lands for which water will be furnished.*—Upon proper application being made therefor, water will be furnished under said project in the irrigation season of 1917 and thereafter, for the irrigable lands of said fifth unit shown on the farm-unit plats of the following townships of the sixth principal meridian, to wit: T. 55 N., R. 99 W.; T. 56 N., R. 99 W., which plats were approved by the Secretary of the Interior on October 4, 1915, and are on file at the local land office at Lander, Wyo., and at the office of the project manager, United States Reclamation Service, Powell, Wyo.

3. *Entries for public lands.*—Homestead entries on the farm units shown on said plats embracing public lands of the United States may be made at said land office at Lander, Wyo., if found regular

and accompanied by the certificate of said project manager that water-right application has been filed and proper water-right charges deposited.

4. *Limit of area for which water right may be secured.*—The limit of area per entry representing the acreage which in the opinion of the Secretary of the Interior may be reasonably required for the support of a family upon such lands is fixed at the amounts shown upon the plats for the several farm units. The maximum limit of area for which water-right application may be made for lands in private ownership shall be 160 acres of irrigable land for each land owner.

5. *Application for water right.*—All water-right applications, whether for public or private lands, must be made to the project manager, United States Reclamation Service, Powell, Wyo., upon forms provided for that purpose and may be made on and after date of this notice. For lands heretofore covered by homestead entries made subject to the provisions of the reclamation laws, water-right applications must be made on or before May 1, 1917, and failure to make such applications shall render such entries subject to cancellation with forfeiture of all rights under the reclamation act, as well as of any moneys already paid. Every application must be accompanied by the proper initial water-right payment, which will be accepted by the project manager in the form of New York draft or money order, payable to special fiscal agent, United States Reclamation Service, Powell, Wyo., or in currency.

6. *Classes of charges for water right.*—The water-right charges are of two kinds, to wit: (*a*) A charge against each irrigable acre to cover the cost of construction of the irrigation system (including partial drainage works within the limits of the Garland division), termed the construction charge; and (*b*) an annual charge against each irrigable acre to cover cost of operation and maintenance of the system, termed the operation and maintenance charge.

7. *Construction charge.*—The construction charge shall be $59 per acre of irrigable land, payable as follows: An initial payment of 5 per centum thereof, or $2.95 per irrigable acre, shall be made at the time of entry or filing of water-right application; the remainder shall be paid in 15 annual installments, the first five of which shall be 5 per centum, or $2.95 each per irrigable acre, and the remainder each 7 per centum, or $4.13 per irrigable acre. The first of said annual installments shall become due and payable December 1 of the fifth calendar year after the initial installment, and subsequent installments shall become due on December 1 of each calendar year thereafter.

8. *Increased construction charge in certain cases.*—In all cases where water-right application for lands in private ownership, or for lands under entries not subject to the reclamation act, shall not be made within one year from the date of this notice, the construction charge for such land shall be increased 5 per centum each year until such application is made and an initial installment is paid.

9. *Advance payment of construction charge permissible.*—Any water-right applicant may, if he so elects, pay the whole or any part of said construction charge within any shorter period than herein provided.

10. *Operation and maintenance charge.*—The operation and maintenance charge upon the fifth unit for the irrigation season of 1917

shall be of the amount in effect for other lands of the project in the same season, and shall be due March 1, 1918. The operation and maintenance charges of future years will be duly announced. They will be payable on March 1 of each year for the preceding irrigation season, except that when original water-right application is filed after June 15 in any year the first payment of such charge becomes due March 1 of the second year thereafter.

11. *Place and manner of payment of water charges.*—All water charges must be paid at the office of said project manager, Powell, Wyo., and may be made in the form of New York draft or money order payable to special fiscal agent, United States Reclamation Service, or in currency.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

PUBLIC NOTICE, MARCH 9, 1917.

1. *Annual operation and maintenance charges.*—In pursuance of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and of acts amendatory thereof and supplementary thereto, and particularly of the reclamation extension act of August 13, 1914 (38 Stat., 686), announcement is hereby made that the annual operation and maintenance charge for the irrigation season of 1917 and thereafter until further notice against all lands of the Shoshone project, Wyoming, under public notice, shall be a minimum charge of 60 cents per irrigable acre whether water is used thereon or not, which charge will permit the delivery of not to exceed 2 acre-feet of water per irrigable acre; and that additional water will be furnished up to a limit of 3 acre-feet per irrigable acre for 20 cents per acre-foot, and all further quantities for 50 cents per acre-foot; subject, however, to the condition that an additional charge of 15 cents per acre-foot will be made for all water delivered from July 5 to August 4, both inclusive. All operation and maintenance charges will be due and payable on March 1 of each year for the preceding irrigation season.

ALEXANDER T. VOGELSANG,
First Assistant Secretary of the Interior.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital given in appendix, p. 530.]

Feature costs of Shoshone project to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys	.....	$66,263.69
Storage works (Shoshone Dam):		
Preliminary and general work	[1] $53.92	268,923.50
Dam and spillway	89.05	896,477.90
Tunnels (permanent)	[1] 881.27	119,902.09
Sluice gates	.....	70,435.19
	[1] 846.14	1,355,738.68
Canal system:		
Preliminary and general work	7,626.97	68,678.18
Diversion dam headworks	.....	97,467.80
Headworks (separate from dam)	.....	57,687.95
Tunnels	74,877.28	1,222,359.71
Main canals	82,735.44	62,601.32
Flumes	.....	112,583.02
Drops, chutes, checks, etc	4,800.11	616,766.77
	170,039.80	2,238,144.75
Lateral system:		
Preliminary and general work	4,291.65	35,075.85
Laterals and sublaterals	76,324.21	384,537.40
Flumes	18,772.82	18,846.31
Bridges	1,827.95	11,998.43
Wasteways	3,562.35	38,361.63
Siphons	16,661.37	18,932.24
Drops, chutes, checks, etc	20,937.20	27,031.47
Headworks	2,950.59	2,950.59
Culverts	4,814.06	5,051.33
	150,142.20	542,785.25
Drainage system:		
Preliminary and general work	183.44	22,699.85
Open drains	9,686.94	85,514.64
Closed drains	68,518.88	438,651.93
	78,389.26	546,866.42
Farm units: Preliminary and general work	3,398.20	16,302.87
Permanent improvements:		
Buildings	8,577.56	19,937.04
Roads	216.45	155,809.14
	8,794.01	175,746.18
Telephone system: Telephone lines	[1] 217.59	10,684.28
Operation and maintenance during construction	2,357.07	2,357.07
Plant accounts	2,135.84	40,579.36
Operation and maintenance charges transferred to and compounded with construction charges	.....	147.75
Undistributed clearing accounts: Costs unexpended	1,256.26	1,256.26
Miscellaneous supplemental construction during operation and maintenance	56.52	49,269.32
Gross construction cost to June 30, 1917	415,505.43	5,046,141.88
Less revenues earned during construction period:		
Rental of buildings	1,310.25	13,712.56
Rental of grazing and farming lands	1,053.60	3,234.90
Rentals of telephones and tolls	46.47	192.22
Contractors' freight refunds	.....	19,355.59
Forfeitures by defaulting bidders and contractors	8,898.99	43,759.07
Other revenues, unclassified	2,636.37	3,786.94
Profit on mess-house operations	[1] 1,687.55	[1] 11,909.73
Profit on mercantile store operations	180.28	3,432.28
Profit on hospital operations	438.68	819.70
Profit on farming operations	[1] 4,217.07	[1] 4,217.07
	8,660.02	72,166.46
Net cost of construction of project to June 30, 1917	.....	4,9739,75.42

[1] Deduct.

Statement of cost by calendar years, Shoshone project.

Year ending Dec. 31—	Construction.	Operation and maintenance under public notice.	Total cost.
1907	[1]$2,238,120.02		$2,238,120.02
1908	710,703.69	$8,808.76	719,512.45
1909	413,333.86	15,278.27	428,612.13
1910	223,696.61	14,580.19	238,276.80
1911	193,474.31	20,525.05	213,999.36
1912	185,915.31	22,435.24	208,350.55
1913	116,739.58	29,708.59	146,448.17
1914	176,764.14	21,377.95	198,142.09
1915	243,615.32	23,186.20	266,801.52
1916	306,263.54	28,531.71	334,795.25
January to June 30, 1917	237,515.50	17,855.93	255,371.43
	5,046,141.88	202,287.89	5,248,429.77

[1] May 1, 1904, to Dec. 31, 1907.

Statement of cost by fiscal years, Shoshone project.

Year ending June 30—	Construction.	Operation and maintenance under public notice.	Total cost.
1907	[1]$1,601,311.42		$1,601,311.42
1908	1,054,541.82	$5,274.65	1,059,816.47
1909	412,384.84	8,913.31	421,298.15
1910	439,389.11	16,711.14	456,100.25
1911	205,630.87	17,982.75	223,613.62
1912	121,766.37	20,917.99	142,684.36
1913	154,406.51	24,908.23	179,314.74
1914	149,693.27	30,040.27	179,733.54
1915	234,717.56	18,588.25	253,305.81
1916	256,794.68	25,695.79	282,490.47
1917	415,505.43	33,255.51	448,760.94
	5,046,141.88	202,287.89	5,248,429.77

[1] May 1, 1904, to June 30, 1907.

Estimated cost of contemplated work, Shoshone project, during fiscal year 1918.

Features.	Estimated cost during fiscal year 1918.	
	Subfeature.	Principal feature.
Canal system:		
Frannie Division—		
Main canals (priming)	$2,000.00	
Structures—Drops, flumes, etc	56,000.00	
Measuring devices	1,000.00	
		$59,000.00
Lateral system:		
Frannie Division—		
Preliminary and general work	1,000.00	
Laterals and sublaterals (priming)	7,000.00	
Structures—Drops, flumes, etc	122,000.00	
Measuring devices	4,500.00	
Pressure pipe, pipe lines, etc	31,500.00	
		166,000.00
Drainage:		
Open drains (10,000 linear feet)	15,000.00	
Closed drains (45,000 linear feet)	45,000.00	
		60,000.00
Farm units: Preliminary and general work		4,000.00
Operation and maintenance under public notice:		
Garland Division—		
Operation	15,140.00	
Maintenance	22,860.00	
Frannie Division:		
Operation	3,900.00	
Maintenance	5,100.00	
		47,000.00
Stores and other operations		1,000.00
Total		337,000.00

SECONDARY PROJECTS.

(A description of all secondary projects may be found in the Fifteenth Annual Report, pp. 508–546. Only those projects on which additional work was done during the fiscal year are referred to here.)

ARIZONA.

COOPERATIVE WELL DRILLING, MOHAVE COUNTY.

Under date of April 19, 1916, an agreement was made by the United States with the State of Arizona in accordance with which the United States was to assist the State of Arizona and board of supervisors of Mohave County to sink or drill an artesian well in the Hualpai Valley, Mohave County, Ariz., for the purpose of obtaining information as to the possibility of securing subterranean water for irrigation by means of artesian wells.

This work has been under way during the past year, and to date the well has been sunk to a depth of 1,040 feet. No artesian water was developed at any point. The work is still under way.

The agreement provides that thirty-five one-hundred-and-twentieths of the expense shall be borne by the United States and the remainder by the State of Arizona. The total amount of money provided for the work is $12,000.

COLORADO.

COLORADO RIVER BASIN.

See Fifteenth Annual Report, page 514. Since publication of the results of these earlier investigations there have been compiled reproductions of correspondence and reports, including maps, photographs, and tabulations, of all data in the Reclamation Service files having a bearing on the problems of Colorado River regulation, both as to flood waters and as to irrigation supply. This information has been prepared in 10 sets and distributed as follows: Office Colorado River Basin investigations, one field copy, one file copy; Washington office, two copies; chief of construction, one copy; assistant chief counsel, Denver, one copy; Yuma, Grand Junction, and Phoenix offices, one copy each; United States Geological Survey, Washington, D. C., one copy.

To the material already thus distributed, results of the investigations made during the fiscal year will be added. Briefly, the results of the investigations during the fiscal year are as follows:

IRRIGABLE AREAS, YAMPA AND WHITE RIVER BASINS, COLORADO.

Field investigations were made in the latter part of 1916 in the Yampa and White River Basins to determine the irrigable areas which may be expected to require a water supply in the future in connection with a study of storage possibilities in Colorado River Basin for extension of irrigation development on lower Colorado River.

As a result of irrigable land examination of canal lines proposed by undeveloped projects and office studies of water-supply data available, the undeveloped irrigable area in these basins that will probably require a water supply in the future is estimated to be 270,000 acres, made up as follows: Yampa River Basin above Little Snake River, 183,000 acres; Little Snake River Basin, 70,000 acres; White River Basin, 17,000 acres.

Examinations were made along the principal streams for storage sites, but only one of sufficient capacity to be of importance for other than local irrigation use was found, besides the Juniper Reservoir site on Yampa River, which has been described at length in the Fifteenth Annual Report, page 516. This is the Rangely site on lower White River, in Colorado, near the Colorado-Utah State line.

In connection with studies of irrigable lands it was found necessary to make plane-table surveys of some relatively small reservoir sites and dam sites in the basin, to determine the feasibility of irrigating various tracts of land whose development had been proposed by Carey Act promoters.

Upper Bear Reservoir site is on Yampa River about 20 miles south of Steamboat Springs, Colo., in Routt County. A. L. Wessels, promoter of a project contemplating use of the storage, furnished the topographic survey of the reservoir site. A topographic survey of the dam site has been made on a scale of 100 feet to the inch, and about 40 miles of canal-line topography was run from the dam site, on a scale of one-half mile to the inch, to determine if areas in Twenty-Mile Park and Hayden Mesa could be served from this reservoir site. A dam raising water 150 feet would flood 1,200 acres. The reservoir capacity at this level is 70,000 acre-feet. Both canyon walls are of granite. A reservoir site controlling such a small part of the Yampa River run-off is of little value for flood control of this stream and may be regarded as of value only for local irrigation use.

Other small storage sites examined were the Trappers Lake site at the headwaters of White River and the Stillwater site on the South Fork of White River about 10 miles above its junction with the main stream. Topographic survey was made of Trappers Lake Dam site on a scale of 100 feet to the inch, showing a maximum feasible storage capacity in the reservoir site of 12,000 acre-feet with a dam raising water 25 feet above the present lake surface and outlet works 10 feet below this surface. The area of the reservoir at high-water level is 380 acres. Topographic survey was made of the Stillwater Reservoir site on a scale of 800 feet to the inch and of the dam site on a scale of 200 feet to the inch. The maximum feasible storage capacity at this site is 15,000 acre-feet, raising water 50 feet and flooding 630 acres.

Rangely Reservoir site, White River.—The Rangely quadrangle of the United States Geological Survey indicated a large storage capacity in an open valley along White River near the western boundary of Colorado. Topographic surveys were made of two dam sites—one just below the open valley about 4 miles below Rangely, Colo., on a scale of 400 feet to the inch, and the other about 7 miles farther downstream, at a narrow place in the canyon, on a scale of 100 feet to the inch. The approximate storage capacities for Rangely Reservoir site are as follows:

Contour.	Area.	Capacity.	Contour.	Area.	Capacity.
	Acres.	*Acre-feet.*		*Acres.*	*Acre-feet.*
5100	0	0	5250	7,000	400,000
5150	1,200	25,000	5300	12,300	860,000
5200	3,140	125,000			

The mean yearly run-off of White River at Rangely is 540,000 acre-feet, partly estimated. The site is of ample capacity for the entire control of White River, but it is not considered attractive from the standpoint of cost and life of reservoir as affected by probable silt deposits.

IRRIGABLE AREAS, UINTA BASIN, UTAH.

Early reference to irrigation possibilities in the Uinta Basin is found in the Third Annual Report, page 544, and in the First Annual Report, pages 287 to 303.

An investigation was made in the fall of 1916 to determine the irrigated area, also the irrigable area which may require a water supply in the future, in connection with a study of storage possibilities on the upper Colorado River for irrigation of additional lands in lower Colorado River Basin.

There were found to be approximately 114,000 acres irrigated in Uinta Basin in 1916 and various plans for the irrigation of approximately 236,000 acres more, or a total of 350,000 acres when fully developed.

Approximately 112,000 acres of land have been allotted to the Ute Indians. The Uintah irrigation project, constructed since 1906 by the United States Indian Service, has brought under irrigation 26,000 acres of the total of nearly 80,000 acres for which the canals are planned. Other private irrigation enterprises and individual ditches bring the total irrigated area to 114,000 acres.

A study of the discharges of the various streams—Duchesne, Uinta, Lake Fork, and Ashley Creek—indicates that it will be impossible to irrigate in the future the 236,000 acres of additional land for which plans have been made. Summer shortage of water, involving legal difficulties, has occurred for several years of low run-off from Lake Fork, Uinta River, and Ashley Creek, along which the greatest irrigation development has taken place.

The additional area which it is believed can be developed in the future by means of minor storage, more economical use of water, and by utilizing the present excess water flowing prior to July, is 126,000 acres, bringing the possible ultimate irrigation development in the basin to 240,000 acres.

Storage possiblities in the basin are confined to a great number of small mountain lakes at the headwaters of the small streams. The cost of developing storage in these small lakes will necessarily be excessive.

Green River can not be utilized as a source of supply for Uinta Basin to any extent, on account of its slight fall through the basin and because the elevation of the river is from 1 to several hundred feet lower than the irrigable lands. Approximately 20,000 acres of irrigable land located between Green River and White River above

their junction, part of which is known as Wonsits Valley, may be irrigated from White River. This area, however, will be flooded if storage is developed in the Ouray reservoir site.

OURAY RESERVOIR SITE.

A topographic reconnoissance survey was made of Desolation Canyon along Green River from a point about 10 miles below Ouray, Utah, to about 6 miles below Minnie Maude Creek, a total length of 30 miles of canyon. The scale used was 1 inch to one-half mile, with contour intervals of 50 to 100 feet. The object was to determine the best dam site for the proposed Ouray Reservoir, in Uinta County, northeastern Utah, where topography recently taken by the United States Geological Survey and shown on the Vernal 30-minute quadrangle revealed the possibility of storing about 10,000,000 acre-feet in this site if a dam site could be found in upper Desolation Canyon suitable for raising the water 150 feet above river level. The best site found is 19 miles below Ouray, where the width between canyon walls is 1,300 feet at the river level and 1,750 feet at a point 150 feet above river level. Detail topography was taken of this site on a scale of 400 feet to the inch. The approximate storage capacities of Ouray Reservoir site are as folows:

Contour.	Area.	Capacity.	Contour.	Area.	Capacity.
	Acres.	*Acre-feet.*		*Acres.*	*Acre-feet.*
4630	0	0	4750	89,400	4,730,000
4650	5,940	47,500	4800	134,200	10,320,000
4675	26,260	450,000	4850	179,000	18,150,000
4700	45,800	1,350,000	4900	225,700	28,265,000

A preliminary report has been made on the Ouray Reservoir site on the basis of 10,000,000 acre-feet storage capacity, allowing 2,000,000 acre-feet for silt deposits, leaving 8,000,000 acre-feet as the effective capacity. The life of the reservoir is estimated to be 250 to 300 years before the 8,000,000 acre-feet capacity is encroached upon and 1,250 to 1,600 years before the reservoir would be completely filled with silt. No dam-site borings have been made. A reservoir at this site would control run-off from Green, Yampa, White, and Duchesne Rivers, and with its large capacity is an important feature in the consideration of any plan, either for storage for lands on the lower Colorado or for flood regulation of the river.

RESERVOIR SITES AND IRRIGABLE AREAS, DOLORES RIVER.

Surveys were made of two reservoir sites on Dolores River (Dolores and Bedrock or Paradox sites) by R. M. Priest in 1914 and 1915. (See Fifteenth Annual Report, p. 519.) The Dolores Dam site is just below Dolores, Colo., and the Bedrock or Paradox site is at the lower end of Paradox Valley and above the mouth of San Miguel River.

These sites were visited by James McKittrick, assistant engineer, in the fall of 1916, and a reconnoissance made of the Dolores River above the Dolores site as far as Rico, Colo. No other storage sites worthy of consideration were found during this reconnoissance. An

area 8 to 10 miles in width, extending from Dolores westward a few miles into Utah, was examined for possible storage sites for water which might be diverted from Dolores River over a low divide a half mile west of Dolores, which separates the Dolores River and San Juan River slopes. No storage sites of consequence were found. A preliminary report has been prepared for the Dolores and Bedrock Reservoir sites from former surveys and dam site inspections made in the field. Following are the flooded areas and capacities for elevations shown:

DOLORES RESERVOIR SITE.

Elevation (assumed).	Acres flooded.	Capacity.	Elevation (assumed).	Acres flooded.	Capacity.
		Acre-feet.			*Acre-feet.*
490	0	0	600	767	37,215
500	19	65	650	1,625	97,015
550	350	9,290	720	3,520	277,100

BEDROCK RESERVOIR SITE.

4890	0	0	5050	6,280	418,040
4940	584	9,800	5100	8,880	797,040
4950	1,825	21,840	5150	12,930	1,342,290
5000	3,872	164,240			

A dam at the bedrock site to provide 284,000 acre-feet net capacity and having a height of 187 feet above low water surface was considered. The spillway crest, 330 feet long, is 15 feet below top of dam. The life of the reservoir is estimated to be at least 425 years, assuming the mean silt content of the river discharge at this point to be 500 parts in a million by weight. The mean annual run-off is estimated to be 400,000 acre-feet per year.

Investigations show that 100,000 acres of land west of and including the Montezuma irrigation district on the San Juan River slope may be brought under irrigation by storage in the Dolores Reservoir site. The estimated cost, however, is excessive, and it is concluded that storage at this site has more value for irrigation of lands on the lower Colorado.

RESERVOIR SITES AND IRRIGABLE AREAS, SAN JUAN RIVER BASIN.

During the latter part of 1916 field investigations were made by James McKittrick in the San Juan Basin to determine irrigable lands and examine storage sites, making such surveys as were necessary to obtain information on which to base estimates. Description of earlier investigations in the San Juan Basin may be found on page 517 of the Fifteenth Annual Report and in earlier reports.

Bluff Reservoir site.—A preliminary topographic survey of the Bluff Reservoir site was made in 1914 by R. M. Priest, under direction of F. L. Sellew; also a detailed survey of the Bluff Dam site, about 12 miles below Bluff City, Utah. Following are the areas and capacities of the Bluff Reservoir site as determined by topographic surveys made:

Assumed elevation.	Acres flooded.	Capacities.	Assumed elevation.	Acres flooded.	Capacities.
		Acre-feet.			*Acre-feet.*
86	0	0	200	6,480	267,600
100	70	350	250	12,520	742,600
150	2,070	53,850	300	20,970	1,579,850

Bluff Reservoir site has been made the subject of a report for Colorado River Basin compilation. In connection with this report plans have been considered for a dam with spillway crest at elevation 206 feet above river surface and with reservoir capacity of 1,400,000 acre-feet.

Silt measurements taken from October 18, 1914, to August 2, 1915, show a ratio of 5,110 parts per million by weight of suspended matter to stream discharge. Using this ratio for a year and taking the average yearly discharge of San Juan River as 2,700,000 acre-feet, assuming that 20 per cent of the silt will find its way through the reservoir and that the silt will weigh 85 pounds per cubic foot by the time the reservoir is filled, the life of the reservoir is estimated to be 173 years.

Plans were also considered for flood control only, and study was made of the flood discharges. The dam considered in this latter plan had its crest 180 feet above river surface at the dam site, or 26 feet lower than the dam considered for storage only. In place of the usual outlet works with gate control permanent openings are proposed. It is estimated that the life of the reservoir for 1,000,000 acre-feet storage capacity, if all silt were deposited above the dam, would be approximately 120 years. It is estimated that the mean length of period when water would be held back and not passed directly through the reservoir is 125 days. It has been concluded after some study that a reliable estimate can not be made of the rate of silting up of a regulating reservoir, but that it will certainly silt up at a much slower rate than a storage reservoir. It is thought the effective life of this reservoir will be at least four times as great, possibly eight or ten times as great, as that of a storage reservoir of the same capacity.

A storage reservoir at the Bluff site as proposed would permit the reclamation of 500,000 acres of additional land in the lower Colorado River Valley at an assumed storage requirement of 2 acre-feet per acre. The cost is considerably cheaper than that with storage at other sites on the San Juan. Supplementary storage to that at Bluff would be required in about 50 years, due to silt encroachments on reservoir capacity.

Such a regulating reservoir as proposed will serve its full purpose for probably more than 500 years, but on account of silt deposits will not materially reduce extreme flood discharges likely to occur on San Juan River after that time. The regulating reservoir is of course of little value for irrigating purposes, but will serve to control floods much more effectively and for a much longer period than a storage reservoir.

If cheaper storage may be had on other contributing streams of the Colorado River for full irrigation development of available lands on

the lower Colorado, storage for flood regulation only, at the Bluff site, becomes of greater value when considered as a part of a comprehensive scheme for flood regulation of Colorado River.

Chaco and Hogback Reservoir sites are located on Chaco and San Juan Rivers, respectively, just above the junction of the two streams. The dam sites are in the canyons where the streams break through a continuous hogback before they join. These sites are about 60 miles above Bluff Reservoir site.

Topographic surveys of the Chaco Reservoir site were made in September, 1916, on a scale of 2 inches to the mile, and of the Chaco and Hogback dam sites on a scale of 4 inches to the mile. No survey of the Hogback Reservoir site was made.

Chaco River has a very small and erratic run-off, although its drainage area is about 4,400 square miles. No records of run-off are available, but it is thought that the mean yearly run-off from this source will not much exceed 100,000 acre-feet. No test borings have been made at these dam sites.

A field examination was made of a tract of 70,000 to 80,000 acres of land west of Chaco dam site and south of San Juan River. Only about 50 per cent of this land is irrigable. A diversion canal to supply this land will have to be at an elevation of approximately 5,180 feet, or 33 feet below the maximum reservoir level considered. The 40,000 acres, together with 30,000 to 40,000 acres more north of the San Juan, can be served by a storage in the Hogback Reservoir.

It appears conclusive that irrigation of these lands in San Juan Basin by storage provided at either of these sites is not feasible, and that Chaco and Hogback sites should be considered only for their value as storage sites for lower Colorado River supply.

Silt studies were made as to the life of each reservoir as a separate storage unit and also as to the life of the reservoirs constructed as a single unit with connecting spillway. Following is a brief summary of results derived from studies and estimates:

Reservoir.	Height of dam to spillway crest.	Storage capacity.	Surplus storage capacity.	Irrigable area possible to serve on lower Colorado.	Estimated number of years in which reservoirs will silt up completely.
	Feet.	*Acre-feet.*	*Acre-feet.*	*Acres.*[1]	
Chaco	173	700,000	0	350,000	275
Hogback	207	1,200,000	0	600,000	169
Chaco	173	1,900,000	300,000	800,000	220
Hogback	207				

[1] Storage requirement of 2 acre-feet per acre assumed to show relative values of reservoirs for storage.

Largo Reservoir site is located at the confluence of Largo, Blanco, and Companero Arroyas, about 9 miles southeast of Largo, N. Mex., and about the same distance from the mouth of Largo Arroya at its junction with San Juan River. Reservoir topography was taken in September, 1916, on a scale of 1 inch to one-half mile and dam-site topography on a scale of 1 inch to one-fourth mile.

The drainage area above the dam site is about 1,200 square miles. The run-off is intermittent and probably can not be depended upon to furnish even part of the storage. Water for this storage develop-

ment would be obtained from San Juan River by means of a feed canal. Lands which would be flooded are of practically no value. It is estimated that the average yearly run-off of Largo Arroya is not more than 50,000 to 60,000 acre-feet. The supply available from San Juan River by diversion canal is ample for any amount of land which could be irrigated from Largo Reservoir.

The arroya for a long distance from the dam site is usually dry, but there is nearly always a small amount of running water at the dam site, which would indicate an impervious foundation either at or near the dam site.

Following is a table of the areas and capacities at the Largo site as determined by the topographic survey made:

Contour.	Area.	Capacity.	Contour.	Area.	Capacity.
	Acres.	*Acre-feet.*		*Acres.*	*Acre-feet.*
5660	0	0	5760	2,040	67,560
5680	121	1,210	5780	2,860	116,560
5700	328	5,700	5820	4,780	268,160
5720	684	15,820	5840	5,830	374,260
5740	1,225	34,910	5860	6,863	501,190

West of Largo Reservoir site and south of San Juan River there is a large area of land extending to Chaco River, which has been variously estimated from 500,000 to 1,250,000 acres of irrigable land. A large part of this area could be served by diversion from Largo Reservoir. An examination of this land during 1916 indicates that but 50 per cent of the land can be considered irrigable, and that the irrigable area that may be served from Largo Reservoir is about 100,000 acres. To serve these lands the length of irrigating canal required, extending from the reservoir to the end of the tract, is 80 miles. Probably 25,000 acres of additional irrigable area may be served by extending the canal 40 miles farther to the Chaco River.

The required storage capacity to serve 100,000 acres of land is estimated to be 320,000 acre-feet to provide for diversion at reservoir of 3.65 acre-feet per acre during the irrigation season. The inflow from the feed canal is taken as extending from March to June, inclusive.

A rough hand-level reconnoissance was made along the feed-canal location for a distance of 18 miles above the dam site. It is estimated that the feed-canal line will have a length of 38 miles to its diversion point from San Juan River. The cost of irrigating the lands considered by means of storage at Largo site, with the expensive feed and distributing canals required, is bound to be heavy. Storage at this site is therefore not believed feasible for local irrigation use.

An estimate for the same volume of storage for use on 160,000 acres on lower Colorado River lands shows the cost of such storage to be much higher than at other storage sites on San Juan River. The life of Largo Reservoir, as affected by probable silt deposits, is estimated to be about 300 years.

Turley Reservoir site is located in northwestern New Mexico near the Colorado State line, the dam site being about 2 miles above Turley, N. Mex. Attention was first brought to this site through investigations by R. M. Priest, in 1914, for storage possibilities in the Grand and San Juan River basins.

The Turley project proposed a large storage in this site for the irrigation of something over 200,000 acres of land lying south of San Juan River and west of the Turley site. The dam proposed had an extreme height of 238 feet and top length of 8,615 feet. Mr. Priest states that a low diversion might be made here, but that storage is out of the question.

Charles B. Smith, reporting July 15, 1915, to J. F. Richardson, engineer, Colorado River basin investigations, on the irrigation possibilities in San Juan River basin, said:

> Any portion of the San Juan River canyon from near Bloomfield to near Arboles would make a very good reservoir site, but no suitable dam site is available.

K. Sawyer, reporting October 1, 1915, on storage possibilities on San Juan River and tributaries above Farmington, N. Mex., states that the dam site is not exceptionally good; that rock is exposed on both sides of the river; and recommends that further investigations be made to secure definite data as to its possibilities. Pending this investigation by Mr. Sawyer, public lands within the reservoir site were withdrawn from entry.

James McKittrick, assistant engineer, made a further examination of this reservoir site in 1916, and made a topographic survey of the dam site on a scale of 4 inches to 1 mile both at and immediately above the proposed Turley site.

According to the filings made by Mr. James Turley, promoter of the Turley project, a dam 200 feet high would store 1,640,000 acre-feet. This estimate is based on a very rough flood line survey of the reservoir site. No topographic survey has been made of the reservoir site. By a comparison of width of valley and river grade through this site with width and river grade at the Bluff Reservoir site, it is estimated that the capacity, with a 200-foot dam at the Turley dam site, is about 1,100,000 acre-feet and the area flooded 16,000 acres.

Inspection was made of a large part of the area under the proposed Turley project. In general, not more than 40 or 50 per cent of this land should be considered as irrigable.

The mean yearly run-off of the San Juan River at the Turley site for the period 1908 to 1914 is found to be approximately 1,470,000 acre-feet.

An estimate has been made for a dam 200 feet high to spillway crest, of the earth and rock-fill type, requiring diversion 36 feet below spillway crest, to serve 125,000 acres of land. The storage cost for these lands is therefore necessarily high. Estimate was also made for canal line and distribution cost. The total estimated cost to serve this area by Turley storage is at least twice the value of irrigation to the lands for the present.

An estimate was also made of the alternative plan of extending a main canal up San Juan River a distance of about 20 miles to divert directly from San Juan River. Storage capacity needed for these lands on upper San Juan River is estimated to be 180,000 acre-feet. The estimated cost of this alternative plan is about 60 per cent of that for storage and distribution from the Turley site.

Conclusions reached are as follows: (*a*) Storage estimated at 1,100,000 acre-feet may be provided at the Turley site by a dam 200 feet high at a reasonable cost; (*b*) the Turley irrigation project is impracticable; (*c*) lands which were proposed to be served from the

Turley Reservoir may be more cheaply served by diversion above the Turley site, but the cost in connection with the silt problem makes the reclamation of these lands impracticable; (*d*) storage in Turley Reservoir site for irrigation on lower Colorado River is practicable and is of value for flood control. Its construction would permit the addition of an irrigable area of probably 400,000 acres to the lands then irrigated in lower Colorado River basin. The effect of silt deposit in the reservoir would begin to be seriously felt in about 50 years, and for that reason additional storage would then be required.

Arboles Reservoir site is located about 8 miles above Arboles, N. Mex. Attention was brought to this site by a report of K. Sawyer, October 1, 1915, on storage possibilities on the San Juan River above Farmington, N. Mex.

No survey of the reservoir site was made. On the basis of a dam raising water 100 feet it is estimate that 4,100 acres would be flooded and that the reservoir capacity would be 140,000 acre-feet. The depth of feasible storage at this site is limited by the fact that a higher dam would flood the present tracks of the Denver & Rio Grande Southern Railway near Arboles. The dam site is not considered practicable for a masonry dam, and the dam used in the estimates is of the earth and rock-fill type. As a result of investigations it is concluded that the largest estimated storage practicable at the Arboles site is 140,000 acre-feet, requiring a dam 100 feet in height. Storage at this site may serve as a small supplementary storage should the Turley or other reservoir sites on lower San Juan River be developed in the future.

Trujillo Reservoir site is located in Colorado, the dam site being about 4 miles below Trujillo, Colo. This site was referred to in a report by K. Sawyer in October, 1915. Further examination of the site was made in 1916. No survey was made of the reservoir site nor of the dam site other than the making of an approximate profile. Sandstone outcrops on both sides of the river at the dam site; and a dam of the gravity masonry type has been used in the estimate, assuming bedrock 30 feet below river surface. The dam estimated on, with spillway crest 125 feet above the river, is 850 feet long, of which 700 feet is spillway crest.

Studies made of the run-off of San Juan River at this site, foundation conditions, and probable silt conditions show that storage of about 90,000 acre-feet estimated capacity may be provided at a reasonable cost at the Trujillo site by a dam 125 feet high. As supplemental storage it would probably be of at least equal importance to the Arboles site.

La Boca Reservoir site.—This reservoir site, about 6 miles below La Boca, Colo., on Los Pinos River, is referred to by Mr. Sawyer in his report. Further examination of this reservoir site was made in 1916. No topographic surveys were made. Foundation conditions are not thought to be suitable for a masonry dam. A dam of the earth and rock-fill type, with spillway crest about 100 feet above river surface, would be about 650 feet in length. On account of its small capacity and relatively high cost this reservoir site can hardly be considered a possibility even for the distant future.

Las Animas Reservoir site is located on Las Animas River above the town of Durango, Colo., the dam site being about 2 miles up-

stream. Topographic survey was made of this reservoir site in 1904 and 1905, under direction of M. C. Hinderlider in connection with his investigation of La Plata project. For description of his investigations, see Fourth Annual Report, page 280. The storage plan proposed by Mr. Hinderlider provided for a reservoir of 200,000 acre-feet capacity for irrigation of lands on La Plata River slope, and he concludes that this storage is impracticable on account of the long, expensive supply canal required to reach the lands. Further investigations were made in 1916 with the object of determining the practicability of a reservoir of larger capacity at the Las Animas site to store the total average run-off for irrigation in Las Animas and lower Colorado River valleys. Dam-site topography was taken on a scale of 400 feet to the inch. Inspection was also made of the reservoir lands which would be required for this larger storage. Following are the approximate areas and capacities of a reservoir at this site:

Contour.	Area.	Capacities.	Contour.	Area.	Capacities.
	Acres.	*Acre-feet.*		*Acres.*	*Acre-feet.*
6530	0	0	6580	3,920	114,100
6540	1,060	5,300	6600	5,040	203,700
6560	2,950	45,400	6640	6,630	437,500

The height of the dam as proposed, from low-water surface of the river to crest elevation of the dam, is 127 feet. Storage would be for 15,000 acres in Las Animas Valley with present almost satisfactory water right, 10,000 acres in Las Animas Valley with present unsatisfactory water right, and 10,000 acres of new lands. In addition, it is estimated that 150,000 acres of lower Colorado River lands could be served from this storage. The amount of silt carried by Las Animas River above the dam site is negligible.

The estimated costs appear not prohibitive and are in favor of consideration of this storage after cheaper storages have been developed for the purpose of serving lower Colorado River lands. For purposes of local irrigation only this reservoir is impracticable. The construction of Las Animas Reservoir will serve to hold back summer floods of 300,000 to 500,000 acre-feet discharge, and therefore have some value for flood control in the lower Colorado River Valley.

SILT OBSERVATIONS.

Silt observation stations have been maintained at Ouray, Utah, for Green River, Duchesne River, and White River, since November, 1916. Similar stations have been maintained on Yampa River at Lay, Colo., and on Green River at Linwood, Utah, since December, 1916. A silt station was established on the San Juan River some 25 miles below Bluff, Utah, on March 1, and has been maintained since. It has been necessary at this latter station and at the station at Ouray, Utah, to maintain experienced men at regular pay. The information desired is, however, very essential to any determination of policy regarding regulation of Colorado River by storage.

IDAHO.

KING HILL PROJECT.

This is a Carey Act project that has been taken over by the State of Idaho through foreclosure sale and was investigated by the United States at the urgent solicitation of the people interested that the Reclamation Service rehabilitate the constructed portions and complete the project.

The project is situated in south-central Idaho in Gooding, Twin Falls, Owyhee, and Elmore Counties, upon bench lands lying along both sides of Snake River in the vicinity of the towns of Bliss, King Hill, Glenns Ferry, and Hammett. The tract comprises about 16,000 acres, extending in a narrow strip on either side of Snake River from near the mouth of the Malad River to Bennett Creek, a distance of 45 miles. The lands of the project have proved to be very fertile and productive, but the surface is broken by a number of deep ravines, which, together with the necessity of four separate crossings of Snake River to reach different parts of the tract, and the great length of the tract compared with its small acreage makes the irrigation system expensive.

The character of the country is such that an unusual amount of flume and pipe construction is necessary, and the formation of much of the country crossed by flumes is such that the unavoidable leakage from the timber flumes used in the original construction caused extensive slides and other disturbances of the surface.

The water supply is obtained from the Malad River, the point of diversion being about 1 mile above its confluence with the Snake River. This stream is fed by springs, starting at a point about 3 miles from the mouth of the river and aggregating about 1,100 second-feet at the point of diversion. The flow is the same winter and summer except when it is increased by surface waters. The supply of 1,100 second-feet was originally owned by the King Hill project, but was conveyed to the Beaver River Power Co. in consideration of an agreement by the latter company to build and maintain the diversion dam on the Malad and the conduit leading from it to the head of the pressure pipe carrying the project water across Snake River, at which point the company is obligated to deliver 300 second-feet to the project.

The water supply appears to be unquestioned as to title, unfailing in its source, and ample in amount for the available project lands.

The distributing system covered an aggregate area under the two branches of the project variously estimated at from 15,000 to 20,000 acres of good irrigable land. Of these lands, 17,244 acres were entered under the Carey Act or as State lands, and were covered by contracts with the operating company for their water supply. Settlement progressed rapidly soon after water became available, but latterly has declined on account of the uncertainties of the water delivery. At present there are 129 water users resident upon the project, engaged in the cultivation of approximately 5,000 acres distributed along the 50 miles of main canal with its lateral system. This represents a project agricultural population of approximately 500 people, who have achieved considerable success in the development of productive farms and comfortable homes, notwithstanding

the drawbacks consequent upon the frequent interruptions of the irrigation service.

After a few years of operation, the two construction companies failed to maintain the canals and they were then operated by a receiver. The receiver's certificates were taken by the State of Idaho, and title to the works now vests in the State through foreclosure sale. The foreclosure sale extinguishes the title of the construction companies and leaves the State, acting as trustee for the settlers, owner of the system, on which there has been paid only a small part of the contract price of $65 per acre.

The condition of the works is such that a large amount of reconstruction is required to place the system in proper condition for successful operation.

A field examination of the entire project was made to check up elevations, distances, cross sections, and dimensions of the project canals and structures for the purpose of verifying data presented by the various written reports at hand. Careful study was given to the numerous maps, profiles, and plans; also engineering reports and sufficient field surveys were made to confirm the general accuracy of the written records. The field surveys also included a cruise of the available irrigable land under both divisions of the project.

The investigation of this project was made by a board of engineers consisting of A. J. Wiley and E. G. Hopson, consulting engineers, and D. W. Cole, senior engineer. The findings of the board are in brief as follows:

(*a*) The total original construction cost of the combined project approximated $1,500,000; the companies making this expenditure are now bankrupt or defunct, and the State of Idaho is in possession of the property, having expended $30,000 in redemption of receiver's certificates and from $50,000 to $60,000 additional in the maintenance of the project since taking it over.

(*b*) The irrigation system completed a few years ago contains much perishable construction, now decayed to an extent that further operation will shortly be impossible without radical reconstruction. Such reconstruction must, for reasons of general economy, follow comprehensive lines of general betterment.

(*c*) A large body of settlers are on the ground and another large body of citizens have purchased lands, relying on the supposed indorsement of the enterprise by both State and Government, on account of its being a Carey Act project. Payment by settlers for water rights have aggregated about $225,000, and values in stock and land improvements, estimated at about $500,000, have been created by the settlers. All of this investment and value will be an absolute loss, entailing great hardships upon the settlers, whose homes and property will be sacrificed if the project be not reconstructed in a substantial manner.

(*d*) Our conclusion would be that the King Hill project might safely be taken over by the United States and handled through the Reclamation Service after organization into an irrigation district under the Idaho State law.

The sundry civil bill passed by the Sixty-fifth Congress of the United States made the following provision for the construction of this project:

King Hill Project, Idaho: For beginning construction, maintenance, operation, and incidental operations, $200,000: *Provided*, That no part of this appropriation shall be expended until the Secretary of the Interior shall have determined that the said King Hill project is practicable as provided by section four of the act approved June 17, 1902, known as the reclamation act, and shall have adopted the said project under and subject to the provisions and conditions of the said act

OKLAHOMA.

TURKEY CREEK PROJECT.

An investigation of this project was made at the request of owners interested for the purpose of ascertaining if any relief could be furnished to the settlers under the project. The request for the investigation was made by petition of 21 landowners after a dam across Turkey Creek, which had previously supplied water for a small area in this valley had washed out. They desired that it be replaced by the Reclamation Service and the project enlarged and extended. The investigation was made and the condition of the project reported upon by Engineer C. T. Pease.

OREGON.

MALHEUR PROJECT.

(See Fifteenth Annual Report, p. 530.) No further investigations have been made for this project by the Reclamation Service, but an irrigation district has been formed and bonds advertised for the construction of Warm Springs Reservoir.

OCHOCO PROJECT.

(See Fifteenth Annual Report, p. 531.) No further investigations have been made by the Reclamation Service. An irrigation district was organized, however, and an unsuccessful effort made to sell bonds for construction of the project.

OWYHEE PROJECT.

(See Fifteenth Annual Report, p. 532.) No further investigations have been made by the Reclamation Service. An unsuccessful effort was made by the people of this project to obtain congressional appropriation for its construction.

ROGUE RIVER VALLEY PROJECT.

(See Fifteenth Annual Report, p. 533.) No further investigations have been made by the Reclamation Service, but an irrigation district has been formed to continue investigations as to water supply and to make further surveys along the lines recommended in the Oregon cooperative work report of 1916 on this project, for what is referred to in that report as the Ashland division. Much work has been done by the irrigation district, and it appears probable that in the near future part, at least, of the project may be constructed.

The Rogue River Valley Canal Co. is also extending its system from time to time.

WYOMING.

WIND RIVER (INDIAN) PROJECT.

An appropriation of $5,000 was made in the Indian appropriation act approved May 18, 1916, for making plans and estimates to complete the irrigation of irrigable lands of the Shoshone or Wind River Reservation, including the ceded lands of this reservation in Wyoming. The Reclamation Service was directed by the Secretary of the Interior to make the investigation and report on the ceded lands portion of this reservation, and $2,000 of the appropriation was set aside for this purpose. The investigation was made during September and October, 1916, and report, with estimates of cost, submitted to the director and chief engineer of the Reclamation Service under date of November 30, 1916. This report appears in full as House Document No. 1767, Sixty-fourth Congress, second session.

WYOMING COOPERATIVE WORK.

A description of the investigations made in the Green River Basin is contained in the Fifteenth Annual Report. This work was reviewed and reported upon by a board of engineers consisting of Messrs. Elwood Mead and E. G. Hopson, consulting engineers, and J. B. True, State engineer of Wyoming. The board's purpose was to make a study of the irrigable lands in the drainage of the Green River in Wyoming, with a view of formulating a policy to control the reservation and disposal of public lands, waters, reservoirs, and power sites, which will secure the highest public advantage in their utilization. Report was made in October, 1916.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix p. 535.]

Cost of secondary projects for fiscal year 1917 and cost to June 30, 1917.

State and project.	Cost for fiscal year 1917.	Cost to June 30, 1917.
Arizona:		
Little Colorado		$9,554.33
Carlos		24,829.51
Pedro		2,427.34
Arizona well drilling	$2,127.14	2,211.10
Arizona-California:		
Colorado River		43,710.00
Colorado River Basin	35,905.82	119,614.13
California:		
Owens Valley		12,061.92
Sacramento Valley		43,620.72
San Joaquin		3,531.20
Iron Canyon cooperative		9,779.45
Pit River cooperative	10.00	2,499.18
Shasta County cooperative	3.76	2,144.75
Lassen County cooperative		1,945.60
Imperial Valley	2,769.98	2,769.98
Kings River storage	1,157.70	1,157.70
Colorado: White River		4,357.00
Idaho:		
Dubois	23.15	17,252.06
Port Neuf		2,168.01
General investigations		1,191.78
King Hill	3,748.30	4,486.69
Swan Valley	544.88	544.88

Cost of secondary projects for fiscal year 1917 and cost to June 30, 1917—Continued.

State and project.	Cost for fiscal year 1917.	Cost to June 30, 1917.
Montana:		
Clark Fork		$5,581.23
Crow Reservation		18,911.96
Lake Basin		7,103.26
Madison River		10,729.09
Marias	[1] $40.00	13,498.60
Nebraska:		
South Platte		2,877.01
Nebraska investigations		3,381.70
Pathfinder pumping		1,554.96
Nevada: Walker River		13,696.37
New Mexico:		
La Plata		28,064.33
Las Vegas		4,014.09
Urton Lake		17,464.70
North Dakota:		
Bismarck		13,621.69
Little Missouri		11,933.52
Nesson		17,471.83
Washburn		10,532.73
Bowman	[1] 287.90	2,660.84
Oklahoma:		
Cimarron		8,891.17
Red River		60,209.27
Oklahoma reconnaissance		400.00
Turkey Creek	137.30	137.30
Oregon:		
Malheur		83,490.62
Central Oregon		40,346.41
Columbia River cooperative	526.50	17,008.51
Oregon cooperative	737.40	50,008.66
Texas: Pecos River investigations		7,115.47
Utah:		
Bear Lake		18,827.72
Utah Lake		34,049.30
Provo-Weber		141.35
Washington:		
Benton	[1] 31.20	11,042.65
Kittitas		19,366.90
Wapato		36,465.77
Palouse		76,393.01
Palouse cooperative	134.80	10,201.92
Priest Rapids		6,216.01
Wyoming:		
De Smet		8,917.38
Wyoming cooperative	1,337.35	3,683.01
Wind River	2,367.52	2,367.52
Miscellaneous preliminary investigations		80,488.73
Gross cost to June 30, 1917	51,142.50	1,071,723.92
Less revenues earned during construction period:		
Profit, messhouse operation	[1] 40.54	[1] 2,483.20
Profit, hospital operations	[1] 58.60	335.90
Revenues, unclassified	1,446.01	1,446.01
	1,346.87	[1] 701.29
Net cost of construction to June 30, 1917		1,072,425.21

[1] Deduct.

Estimated cost of contemplated works of secondary projects for fiscal year 1918.

Principal feature: Estimated expenditures during fiscal year 1918, examination and surveys, $50,000.

INDIAN IRRIGATION PROJECTS.

MONTANA, BLACKFEET (INDIAN) PROJECT.

R. M. SNELL, project manager, Browning, Mont.

LOCATION.

County: Teton.

Townships: 31 to 34 N., Rs. 5 to 10 W.; 29 N., R. 8 W.; 30 N., Rs. 6 to 9 W.; and 35 N., Rs. 6 and 7 W., Montana meridian.

Railroad: Great Northern.

Railroad stations and estimated population January 1, 1917: Browning, 500; Blackfoot, 100; Bombay; Seville; Cadmus; Glacier Park, 100; and Cutbank, 1,200.

WATER SUPPLY.

Source of water supply: Two Medicine River, Cutbank, Badger, Birch, Whitetail and Blacktail Creeks.

Area of drainage basins: 1,700 square miles.

Annual run-off in acre-feet: Cutbank Creek at Cutbank (971 square miles), 1906 to 1916, maximum, 269,000; minimum, 76,370; mean, 148,000. Two Medicine River at Family (368 square miles), 1907 to 1916, mean, 292,050. Badger Creek near Family (224 square miles), 1907 to 1916, mean, 162,000. Birch Creek at Dupuyer (155 square miles), 1907 to 1915, mean, 106,250.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which service is prepared to furnish water, season of 1917: 48,240 acres.

Area under water-right applications, season of 1916: 4,426 acres.

Area irrigated season of 1916: 2,102 acres.

Length of irrigating season: May 1 to September 30, 153 days.

Average elevation of irrigable area: 3,850 feet above sea level.

Rainfall on irrigable area, 1909 to 1916, average, 13.72 inches; 1916, 15.94 inches.

Range of temperature on irrigable area: −56° to 100° F.

Character of soil of irrigable area: Principally rich sandy loam; some gravelly loam and gumbo.

Principal products: Hay, grain, and vegetables.

Principal markets: Great Northern Railway towns from St. Paul to the Pacific coast. Local demand for hay for stock feeding.

LANDS OPENED TO IRRIGATION.

No lands have been opened to irrigation by public notice. All lands covered by canals are allotted to Indians.

CHRONOLOGICAL SUMMARY.

Reconnoissance and preliminary surveys made in 1907.

Construction work on the Two Medicine unit begun in July, 1908.

Construction of Two Medicine Lake Dam begun in June, 1911; completed August, 1913.

Construction of the Badger-Fisher unit begun in June, 1911.

Two Medicine unit, 73 per cent completed, June 30, 1917.

Badger-Fisher unit, 69 per cent completed, June 30, 1917.

Birch Creek unit, 60 per cent completed, June 30, 1917.

Entire project 29 per cent completed, June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the Blackfeet project provides for five irrigation systems on the Blackfeet Indian Reservation, as follows: (1) The Cutbank north canal system heading on the left bank of Cutbank Creek and supplying water for 20,000 acres of land north and east of the creek, 11,000 acres of which are outside of the reservation; (2) the Cutbank south canal system heading on the right bank of Cutbank Creek and supplying water for 18,000 acres of land near Carlow and Seville stations on the Great Northern Railway; (3) the Two Medicine Canal systems, diverting from the left bank of the Two Medicine River and supplying water through the North Branch Canal, the Spring Lake Reservoir, and the South Branch Canal to 48,000 acres of land; (4) the Badger-Fisher Canal system diverting water from the right bank of Badger Creek, supplying water direct through a feeder canal to 3,000 acres of land on the Piegan Flats and through the Four Horns supply canal and reservoir and the Fisher Canal to 30,000 acres of land between Badger and Birch Creeks; and (5) the Birch Creek Canal system, diverting from the left bank of Birch Creek, and supplying water to 3,500 acres of land between Birch and Blacktail Creeks. The United States claims all waste, seepage, spring, and percolating water arising within the project, and proposes to use such water in connection therewith.

The irrigable lands of the project are located, in general, in the southeastern portion of the Blackfeet Indian Reservation adjacent to the north bank of Cutbank Creek and between Cutbank Creek and Birch Creek. Of the above irrigation plan the first development of the Two Medicine Canal system has been completed, including 36 miles of main canal, with headworks and other structures and distribution system complete with structures to deliver water to approximately 24,000 acres of land. A storage reservoir has been constructed at lower Two Medicine Lake to furnish a maximum storage of 16,000 acre-feet of water for this unit. On the Badger-Fisher unit a small canal and lateral system has been constructed, with the exception of small laterals and structures to reach unallotted land, diverting water from Badger Creek direct to approximately 3,000 acres of the Piegan Flats. A supply canal, 12 miles long, diverting water to Four Horns Reservoir has been completed to its first development. Temporary controlling works to Four Horns Lake have been completed, making available a reservoir of 4,000 acre-feet capacity. Water from this storage follows a natural channel to Blacktail Creek, from which it is diverted into the Fisher Canal, designed to irrigate about 30,000 acres of Fisher Flats. The Fisher Canal has been completed to its first development, both as to excavation and structures, to the end at mile 30. Excavation of a lateral system has been completed to cover approximately 20,000 acres of allotted land on the Fisher Flats. The larger structures on the lateral system have been completed and the smaller ones will be built as needed. The Birch Creek Canal and main lateral have been completed as to excavation to irrigate 2,600 acres of land. The larger structures on this system have have been completed and the smaller structures will be built as needed.

Work for the immediate future includes the construction of small structures on Two Medicine, Fisher, and Birch Creek systems as needed, and the enlargement of a portion of Two Medicine Canal. No work has been done on the Cutbank units.

SUMMARY OF GENERAL DATA FOR BLACKFEET PROJECT TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is complete		122,500
Public land entered to end of fiscal year	11,000	
Public land withdrawn at end of fiscal year	50,020	
Indian land	61,480	
Acreage service could have supplied season of 1916		46,640
Addition in fiscal year 1917		1,600
Estimated addition in fiscal year 1918		4,000
Estimated acreage service can supply July 1, 1918		52,240
Acreage actually irrigated, season of 1916		2,106
Acreage cropped under irrigation, season of 1916		1,976
Crops:		
Value of irrigated crops, season of 1916		$24,563.40
Value of irrigated crops per acre cropped		$12.43

Finances:		
Gross construction cost to end of fiscal year		$1,002,391.37
Per cent complete at end of fiscal year		29
Appropriated for fiscal year 1918, total		$28,900.00
Allotment for construction, fiscal year 1918		$30,100.00
Estimated per cent complete, June 30, 1918		30
Proposed appropriation, fiscal year 1919, for construction		$100,000.00
Estimated gross construction expenditures to June 30, 1919		$1,132,491.37
Estimated per cent complete, June 30, 1919		32
Appropriation, fiscal year 1917		[1] $26,023.15
Expenditures during fiscal year, chargeable to 1917 appropriation—		
Disbursements	$15,994.71	
Registered liabilities chargeable to 1917 appropriation	7,813.34	
		23,808.05
Unencumbered balance, July 1, 1917		2,215.10

NOTE.—The Blackfeet project is being constructed to irrigate land allotted to members of the Blackfeet Indian Tribe. Construction charge has not been announced. No charge has been made to cover operation and maintenance.

CONSTRUCTION DURING FISCAL YEAR.

Two Medicine unit.—One log crib was constructed and filled with rock to divert the Two Medicine River away from the canal.

Birch Creek unit.—A lateral 8 miles in length was excavated and a number of minor structures were built.

SEEPAGE AND DRAINAGE.

The lands under the project have been affected by seepage very little, if any, and no drainage works have been constructed.

BOARD MEETINGS.

Subject.	Place.	Date.	Personnel.
Irrigation system, Blackfeet project.	Family, Mont.	May 25, 1908	H. N. Savage, W. B. Hill, E. F. Tabor, G. E. Goodwin.
Two Medicine Lake Reservoir dam.	Two Medicine Lake, Mont.	June 20 and 21, 1911.	H. N. Savage, D. C. Henny, C. P. Williams, Joseph Wright, R. M. Snell.
Recommendations for 1918 expenditures.	Browning, Mont.	May 15, 1917	C. P. Williams, F. P. Shanck, R. M. Snell.

OPERATION AND MAINTENANCE.

The Two Medicine, Badger-Fisher, and Birch Creek systems were operated during the season of 1916, a total of 2,102 acres being irrigated. These systems are being operated this season with about 3,000 acres under cultivation.

Historical review, Blackfeet project.

Item.	1913	1914	1915	1916	1917
Acreage for which the service was prepared to furnish water	26,640	26,640	26,640	46,640	48,240
Acreage irrigated	.....	675	1,618	2,102	[2] 2,860
Miles of canal operated	.....	44	65	109	109
Water diverted (acre-feet)	700	15,380	8,254	7,036	.....
Water delivered to land (acre-feet)	.....	4,430	2,970	1,735	.....
Per acre of land irrigated (acre-feet)	.....	.....	1.83	.83	.....

[1] Includes refunds authorized to be added to 1917 appropriation. [2] Estimated.

SETTLEMENT.

Land under the project has not yet been opened for settlement. About 55,000 acres have been allotted to Indians, but, except in a few cases, have not been settled upon by them or farmed.

Settlement data, Blackfeet project.

Item.	1912	1913	1914	1915	1916	1917
Total number of farms on project	3,000	3,000	3,000	3,000	3,000	3,000
Population	(1)	(1)	(1)	(1)	(1)	(1)
Number of irrigated farms			12	18	79	[2] 173
Operated by owners or managers			12	16	79	79
Operated by tenants				2		94
Population			40	50	170	170
Number of towns	4	4	4	4	4	4
Population	300	300	300	375	1,750	1,900
Total population in towns and on farms	300	300	340	425	1,920	2,070
Number of schools	1	1	1	1	5	5
Number of churches	2	2	2	3	8	8
Number of banks					3	3

[1] Not opened. [2] Estimated.

PRINCIPAL CROPS.

The principal crops are hay, small grain, and vegetables. Timothy, alfalfa, oats, flax, barley, winter and spring wheat, potatoes, and roots do well when given proper care. Unusual rainfall in 1915 and 1916 made irrigation less necessary than usual. Irrigation in 1917 will probably be necessary to mature crops.

Crop report, Blackfeet (Indian) project, Montana, 1916.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa [1]	97	Tons	138	1.42	$7.00	$966.00	$9.95
Barley	5	Bushels	161	32	.60	96.60	19.20
Flax	113	do	1,584	14	2.20	3,484.80	30.84
Garden	16½	Acres			60.00	990.00	60.00
Hay, grain	105	Tons	127	1.2	6.00	762.00	7.26
Hay, native	994½	do	1,000	1	5.00	5,000.00	5.00
Oats	366½	Bushels	10,280	28	.55	5,654.00	15.43
Potatoes	4½	do	740	150	1.00	740.00	164.44
Timothy	84	Tons	120	1.4	7.00	840.00	10.00
Wheat	190	Bushels	4,020	21	1.50	6,030.00	31.73
Total cropped acreage	1,976	Total and average				24,563.40	12.43

		Areas.	Acres.	Farms.	Per cent of project.
Irrigated, no crop:		Irrigable area farms reported	4,426	79	9.2
Fall plowing	119	Irrigated area farms reported	2,102	79	4.4
Fall seeding	7	Under water-right applications	2,102	79	4.4
		Cropped area farms reported	1,976	77	4.1
Total irrigated acreage	2,102				

[1] Acres of alalfa new seeding not harvested.

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix, p. 536.]

Feature costs of Blackfeet project to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys	$1,134.46	$6,470.70
Storage system:		
Two Medicine unit		142,065.44
Spring Lake Reservoir, survey and design		1,942.68
Badger Creek Reservoir, survey and design		310.92
Four Horns Reservoir, survey and design		1,344.64
Four Horns Reservoir, dam	[1] 62.42	11,472.45
Total storage system	[1] 62.42	157,136.13
Canal system:		
Cutbank unit, surveys and designs		1,008.74
Birch Creek unit, surveys and designs		1,662.40
Carlow unit, surveys and designs		623.46
Two Medicine canal	890.81	300,780.90
Two Medicine headworks		32,947.53
Four Horns Supply Canal	227.51	102,883.68
Four Horns Supply Canal headworks		8,883.49
Fisher Main Canal		147,391.14
Blacktail diversion		15,334.45
Piegan Canal headworks		1,682.04
Siphon, White Tail Creek crossing		13,881.77
Birch Creek Canal headworks		2,211.38
Birch Creek Main Canal	955.84	8,752.60
Undistributed cost of plant to June 30, 1915, transferred to plant account	[1] 6,535.73	
Total canal system	[1] 4,461.57	638,043.58
Lateral system:		
Two Medicine lateral system		12,103.91
Piegan lateral system		16,813.11
Fisher Canal lateral system		85,986.89
Birch Creek lateral system, survey and designs	426.24	976.51
Birch Creek lateral system	6,474.72	6,474.72
Badger-Fisher laterals	315.85	494.76
Fisher Canal drop, N lateral, station O	1,619.04	5,406.02
Total lateral system	8,835.85	128,255.92
Permanent improvements:		
Buildings, all units		11,603.98
Roads, Fisher Canal distribution system		2,836.38
Roads, Two Medicine division		7,504.42
Roads, Piegan distribution system		202.10
Roads, Browning to Robare	37.95	37.95
Wells, Two Medicine division		1,552.21
Total permanent improvements	37.95	23,737.04
Telephone system		8,298.20
Operation and maintenance during construction	10,401.33	34,091.42
Plant account		6,351.94
Undistributed clearing account	6.44	6.44
Gross constructon cost to June 30, 1917	15,892.04	1,002,391.37
Less revenues earned during construction period:		
Rental of buildings	51.60	891.25
Rental of telephones and tolls	25.05	739.65
Contractors' freight refunds		36.04
Other revenues unclassified		7.50
Profit on mess-house operations	[1] 213.35	7,736.81
Profit on mercantile store operations		18,955.99
Profit on hospital operations	33.95	662.28
Net cost of construction of project to June 30, 1917	[1] 102.75	29,029.52
		973,361.85

[1] Deduct.

Statement of cost by calendar years, Blackfeet project.

Year ending Dec. 31—	Construction.	Operation and maintenance during construction.	Total cost.
1907	$1,769.20	.....	$1,769.20
1908	59,192.31	.....	59,192.31
1909	109,900.55	.....	109,900.55
1910	152,674.36	.....	152,674.36
1911	173,373.96	$8,372.50	181,746.46
1912	189,797.18	4,696.85	194,494.03
1913	152,716.96	1,154.75	153,871.71
1914	75,224.26	4,334.33	79,558.59
1915	35,548.24	2,026.60	37,574.84
1916	11,489.05	4,836.78	16,325.83
January to June 30, 1917	261.94	8,669.61	8,931.55
Plant account	6,351.94	.....	6,351.94
Total	968,299.95	34,091.42	1,002,391.37

Statement of cost by fiscal years, Blackfeet project.

Year ending June 30—	Construction.	Operation and maintenance duriug construction.	Total cost.
1908	9,047.80	.....	$9,047.80
1909	86,251.96	.....	86,251.96
1910	146,464.17	.....	146,464.17
1911	140,737.83	.....	140,737.83
1912	213,957.37	$1,731.57	215,688.94
1913	166,663.04	11,977.10	178,640.14
1914	132,594.42	4,088.12	136,682.54
1915	36,674.44	1,784.35	38,458.79
1916	24,066.27	4,108.95	28,175.22
1917	5,490.71	10,401.33	15,892.04
Plant account	6,351.94	.....	6,351.94
Total	968,299.95	34,091.42	1,002,391.37

Estimated cost of contemplated work, Blackfeet project, during fiscal year 1918.

Features.	Estimated cost during fiscal year 1918.	
	Subfeature.	Principal feature.
Examination and surveys:		
Stream gaging	$800.00	
Miscellaneous surveys, canal and locations, etc	700.00	
		$1,500.00
Storage system: Four Horns Reservoir	.....	500.00
Canal system:		
Two Medicine Canal—excavation	1,000.00	
Two Medicine Canal—cribwork	1,200.00	
Two Medicine Canal—riprap	800.00	
		3,000.00
Lateral system: Two Medicine, Badger-Fisher, and Birch Creek units; construction of small laterals and structures as required to reach allotted lands	.....	3,000.00
Permanent improvements: Bridges across Badger and Birch Creeks and purchase of land for canal riders' headquarters	.....	2,000.00
Telephone system: Maintenance and repairs	.....	800.00
Operation and maintenance:		
Development, Two Medicine Reservoir	200.00	
Carriage, operation	2,300.00	
Carriage, maintenance	7,800.00	
Distribution, operation	1,400.00	
Distribution, maintenance	3,300.00	
		15,000.00
Store and other operations	.....	600.00
Plant and equipment: Miscellaneous equipment	.....	2,500.00
Total	.....	28,900.00

MONTANA, FLATHEAD (INDIAN) PROJECT.

F. T. Crowe, project manager, St. Ignatius, Mont.

LOCATION.

Counties: Flathead, Missoula, Sanders.
Townships: 15 to 25 N., Rs. 17 to 25 W., Montana meridian.
Railroad: Northern Pacific.
Towns and estimated population, January 1, 1917: Evaro, 75; Arlee, 200; Ravalli, 125; Dixon, 300; Perma, 50; Camas, 50; Dayton, 100; Big Arm, 75; Polson, 2,000; St. Ignatius, 275; Ronan, 575; and Hot Springs, 175.

WATER SUPPLY.

Source of water supply: Jocko and Little Bitter Root Rivers; Mud, Crow, Post, Mission, Dry, Finley, Agency, Big Knife, Valley, and Falls Creeks; and about 60 smaller streams.
Area of drainage basin: 225 square miles.
Annual run-off in acre-feet of creeks, 1909 to 1916. Maximum, 417,400; minimum, 231,100; mean, 299,200.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service is prepared to supply water, season of 1917: 80,300 acres.
Area under water-rental applications, season 1917 (to June 30): 18,240 acres.
Length of irrigating season: May 1 to September 30, 153 days.
Average elevation of irrigable area: 3,000 feet above sea level.
Rainfall on irrigable area: At St. Ignatius (Mont.) station, 1909 to 1916, average, 18.34 inches; 1916, 25.15 inches.
Range of temperature on irrigable area: −30° to 96° F.
Character of soil of irrigable area: Varies from light sandy loam to heavy clay.
Principal products: Grain, hay, vegetables, fruit, and cattle.
Principal markets: Missoula, Butte, and Anaconda, Mont., and other mining and lumber towns and camps.

LANDS OPENED FOR IRRIGATION.

Dates of public notices and orders: Proclamation of the President May 22, 1909, opened lands to filing under certain rules as to registration, etc., first filing to be May 2, 1910.
Location of lands opened: Tps. 17 to 24 N., Rs. 19 to 24 W., Montana meridian.
Present status of irrigable area opened: About 47,500 acres have been entered; 86,000 acres in private ownership, mostly Indian allotments held under trust patents; 11,000 acres of State lands.
Limit of area of farm units: 160 acres; average irrigable, about 40 acres.
Duty of water: Works will provide about 1.3 acre-feet per acre per annum at the farm.
Building charges: Not fixed.
Annual operation and maintenance charges: Rental basis, 50 cents per acre-foot.

CHRONOLOGICAL SUMMARY.

Reconnoissance and preliminary surveys begun in 1907.
Construction authorized and first appropriation made by act of Congress approved April 30, 1908.
Construction begun, Jocko, Mission, and Polson divisions, 1909.
Land opened to homestead entry, May, 1910.
Irrigation in Jocko and Mission divisions begun in 1910.
Irrigation in Post division begun in 1911.

Kickinghorse feeder canal completed in 1912.
Irrigation in Polson and Pablo divisions begun in 1913.
Entire project 36.3 per cent completed June 30, 1917.

IRRIGATION PLAN.

The irrigation plan of the Flathead project provides for the irrigation of about 134,500 acres of land in various parts of what was the Flathead Indian Reservation, water being diverted from creeks and rivers rising in the Mission Mountains and conducted by canals directly to the land and to reservoirs for the storage of flood waters. About 8 reservoirs will be constructed. Some of these are lakes, the capacity of which will increase, and others natural basins, which will require only the building of embankments at low points. Irrigable tracts on the Jocko, Mission, Post, Pablo, and Polson divisions, which contain the largest percentage of irrigable land allotted to the Indians, have been selected for the first development. The United States claims all waste, seepage, spring, and percolating water arising within the project and proposes to use such water in connection therewith.

The following principal features have been completed: A distribution system covering approximately 13,500 acres in Jocko Valley, taking water from Jocko River and tributaries; a distribution system covering about 6,600 acres and taking water from Mission Creek; a distribution system lying below Kickinghorse Dam site, covering about 2,000 acres; a distribution system lying under the Ninepipe Reservoir, covering about 21,500 acres, which, together with the previous-mentioned tract, takes water from Post Creek and tributaries; a distribution system taking water from Crow Creek for about 3,800 acres in Moiese Valley; a distribution system under Pablo Reservoir, taking water from Post, Crow, and Mud Creeks for about 31,700 acres; and a distribution system taking water from the last-named creeks for about 1,200 acres near Polson. Two storage reservoirs have been constructed—Pablo Reservoir for 5,000 acre-feet and Ninepipe for 5,000 acre-feet. The Pablo Feeder Canal has been built from 2 miles south of Post Creek to Pablo Reservoir, a distance of about 29 miles, picking up the waters of all streams flowing from the mountains.

SUMMARY OF GENERAL DATA FOR FLATHEAD PROJECT TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is complete		134,500
Public land entered to end of fiscal year	35,780	
Public land withdrawn at end of fiscal year	6,720	
State land	9,635	
Indian land	81,375	
Private land	990	
Acreage service could have supplied season of 1916		66,000
Addition in fiscal year 1917		14,300
Estimated addition in fiscal year 1918		17,300
Estimated acreage service can supply July 1, 1918		97,300
Acreage actually irrigated, season of 1916		4,373
Acreage cropped under irrigation, season of 1916		4,260
Crops:		
Value of irrigated crops, season of 1916		$66,935.00
Value of irrigated crops per acre cropped		$15.71
Finances:		
Gross construction cost to end of fiscal year 1917		$2,568,372.32
Per cent complete at end of fiscal year 1917		36.3
Appropriated for fiscal year 1918, total		$750,000.00
Allotment for construction, fiscal year 1918		$581,000.00
Estimated per cent complete, June 30, 1918		46.5
Proposed appropriation, fiscal year 1919, for construction		$750,000.00
Estimated gross construction expenditures to June 30, 1919		$3,899,372.32
Estimated per cent, complete, June 30, 1919		57
Appropriation, fiscal year 1917	[1] $920,790.55	
Increase	[2] 750,000.00	
		$1,670,790.55

[1] Includes balance of 1916 appropriation and refunds authorized to be added to 1917 appropriation.
[2] Included in 1917 appropriation because available on May 28, 1917.

Finances—Continued.		
Expenditures during fiscal year chargeable to 1917 appropriation—		
Disbursements	$872,773.29	
Registered liabilities chargeable to 1917 appropriation	89,719.98	
Contract obligations wholly covered by 1917 appropriation	57,269.41	
		$1,019,762.68
Unencumbered balance, July 1, 1917		$651,027.87
Repayments:		
Water-rental charges—		
Accrued to end of fiscal year		$35,814.00
Collected to end of fiscal year		$22,570.13
Uncollected at end of fiscal year		$13,243.87
Drainage:		
Estimated acreage damaged by seepage to end of fiscal year		360
Miles of drains built to end of fiscal year—		
Open	0.18	
Closed	2.97	
		3.15
Estimated acreage protected by drains built to end of fiscal year		1,240

CONSTRUCTION DURING FISCAL YEAR.

Jocko division.—The Finley Creek system on the south side was completed by contract work, adding about 5,000 irrigable acres.

Mission division.—Government forces at Tabor Reservoir completed the tunnel from the outlet to the lake shore, a distance of about 1,400 feet. The lined section was excavated and partially lined. The gate shaft and temporary shaft at the lake shore were sunk. Lateral C headworks and a small percentage of the minor structures were built by Government forces. Excavation of the lateral, which is being done under contract, is about 50 per cent complete.

Post division.—The 25-foot cut at the outlet of McDonald Lake was completed to the shore and concreting of the conduit and base of the tower was started. Lateral F was practically completed, adding 4,500 acres to the irrigable area. Moiese 30MA lateral extension was completed, supplying water for 1,800 acres.

Pablo division.—Excavation on laterals 70A and 71A and excavation of structures on 31A high line were completed by contract; the structures on lateral 70A and lateral 71A were completed by Government forces, adding approximately 8,000 acres of irrigable land to this division. The excavation of structures on laterals 43A and 50A are being constructed by contract and were approximately 90 per cent complete at the end of the year.

Camas division.—At Little Bitter Root Lake the dam and outlet works were completed, providing storage for 9,000 acre-feet. The arched diversion dam at the head of Camas A Canal was about 70 per cent complete. The tunnel was excavated but not lined. The concrete flume was about 60 per cent complete. The lined section was excavated, but no concrete had been placed. A steam shovel was used on the excavation of the canal, which was about 25 per cent complete. All of the work on the Camas A Canal is being done by Government forces. Government forces built a few minor structures and made about 3,000 feet of concrete pipe for the Camas lateral system.

SEEPAGE AND DRAINAGE.

The Polson drainage system was completed, and seepage conditions have been much improved. The surface is practically dry, although water still stands in a few of the cellars in that vicinity. No seeped areas have appeared on other portions of the project.

BOARD MEETINGS.

Date.	Topic.	Personnel.
July 24–27, 1916	Consideration of construction program for fiscal year 1917.	A. P. Davis, F. E. Weymouth, E. F. Tabor.
Aug. 20–25, 1916	do	A. J. Wiley, Charles P. Williams, F. T. Crowe.
Feb. 20–23, 1917	Mission Valley storage requirements and consideration construction program, fiscal year 1918.	Do.
Mar. 12, 1917	Location of canals and design of structures	Project employees.
Apr. 24, 1917	Type of dam for Upper Hubbart Reservoir	Charles P. Williams, F. T. Crowe.

OPERATION AND MAINTENANCE.

The season of 1916 was one of a cycle of rather wet years, the precipitation at St. Ignatius being 25.15 inches, which is the greatest rainfall ever recorded. This had a direct effect on the acreage irrigated. As the principal crop is grain, the practice was to dry-farm this crop, irrigating only hay, gardens, orchards, etc. The number of applications received was 345. Water was actually delivered to 239 farms, on which 4,373 acres were irrigated. The amount of water used was 5,751 acre-feet, representing an average duty of 1.32 acre-feet. The acreage irrigated as well as the amount of water used per acre show an increase over 1915. The spring of 1917 was late, but relatively not so late as in other parts of the Northwest. There was a material increase in the acreage cropped, wheat leading in the increase. June closed with dry, warm weather, with a decided increase in the demand for water. Up to the end of the fiscal year 320 applications, representing an irrigable area of 18,240 acres, had been received, and 4,200 acres had been irrigated.

Historical review, Flathead project.

Item.	1910	1911	1912	1913	1914	1915	1916	[1] 1917
Acreage for which service was prepared to supply water	10,000	19,000	35,000	42,400	48,900	52,400	66,000	80,300
Acreage irrigated	2,191	2,369	4,203	4,631	6,416	3,242	4,373	4,200
Miles of canal operated		46	103	180	233	201	232	250
Water diverted (acre-feet)	18,857	10,940	21,875	22,945	46,329	21,029	23,942	[2] 16,800
Water delivered to the land (acre-feet)	9,936	4,719	8,344	6,104	8,752	3,637	5,751	[2] 3,500
Per acre of land irrigated (acre-feet)	4.53	1.99	1.98	1.30	1.36	1.12	1.32	.83

[1] To June 30, 1917. [2] Estimated.

SETTLEMENT.

New settlers have come to the project, taking the place of those dissatisfied as well as settling State lands and tracts purchased from Indians. At a sale of allotments belonging to deceased and incompetent Indians held November, 1916, a total of 56 tracts were sold, at an average price of $24.78 per acre. A similar sale was held in the spring of 1917. The building of the branch line of the Northern Pacific Railway from Dixon to Polson has had a tendency to increase land values and has stimulated building activity at Ronan and Polson.

Settlement data, Flathead project.

Item.	1912	1913	1914	1915	1916	[1] 1917
Total number of farms on project irrigable [2]	2,980	2,980	2,980	2,980	2,980	2,980
Population	8,000	8,400	13,855	14,000	14,000	[3] 14,500
Number of irrigated farms	111	155	223	185	303	325
Operated by owners or managers	84	127	188	159	219	235
Operated by tenants	27	28	35	26	84	90
Population	[4]	[4]	578	433	627	670
Number of towns	10	10	10	11	12	12
Population	[4]	[4]	2,842	3,147	3,460	4,000
Total population in towns and farms	[4]	[4]	16,697	17,147	17,460	18,500
Number of public schools			36	48	51	55
Number of churches			14	14	15	15
Number of banks			9	9	9	9
Total capital stock			$205,000	$205,000	$205,000	$205,000
Total deposits			$535,870	$495,000	$745,733	$1,283,988
Total depositors			2,614	2,603	3,669	4,608

[1] June 30, 1917.
[2] Includes both irrigated and "dry" farms on project.
[3] Estimated.
[4] Included in second item.

PRINCIPAL CROPS.

Crop conditions during 1916 were, on the whole, good. A limited area of the project was visited by hail and a smaller area damaged by grasshoppers. Wheat was the leading crop, the yield being fair and the price good. The yield of all hay crops was good and the price was favorable, due to local demand. There was a small increase reported in the value of farm products per acre. This increase was augmented by the general rise in prices of farm products toward the end of the year. There was an increase in the number and value of live stock on the farms.

Crop report, Flathead project, Montana, year of 1916.

Irrigated crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit.	Tota.	Per acre.
Alfalfa hay	633.23	Tons	1,159.31	1.83	9.00	$10,433.79	$16.47
Alfalfa seed	6.55	Bushels	6.55	1.00	12.00	78.60	12.00
Barley	49.37	do	761.50	15.42	.60	456.90	9.25
Beans	.51	do	15.30	30.00	6.00	91.80	180.00
Clover hay	473.68	Tons	619.11	1.31	9.00	5,571.99	11.76
Corn, fodder	9.50	do	18.40	1.94	9.00	165.60	17.44
Garden	39.77				51.70	2,051.85	51.70
Hay	1,060.62	Tons	1,582.33	1.49	10.00	15,823.30	14.92
Oats	1,052.06	Bushels	32,398.1	30.79	.48	15,551.10	14.78
Pasture	968.03				3.51	3,394.42	3.51
Peas	5.10	Bushels	51.00	10.00	4.80	244.80	48.00
Potatoes	10.60	do	1,225.74	115.50	.90	1,103.17	103.95
Wheat	690.44	do	12,868.7	18.61	.93	11,967.86	17.30
Total cropped acreage	4,259.89	Total and average				66,935.18	15.71

		Areas.	Acres.	Farms.	Per cent of project.
Irrigated, no crop:					
Young alfalfa	50.39	Total irrigable area farms reported	13,544	239	8.91
Young clover	62.39	Total irrigable area farms reported	4,373	239	2.88
Young hay	30.09	Under rental contracts	4,373	239	2.88
Young orchard	40.60	Total cropped area farms reported	10,450	239	6.88
Miscellaneous	6.29				
Less duplicated areas	77.04				
Grand total irrigated	4,372.61				

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix, p. 537.]

Feature costs of Flathead project to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	Total to June 30, 1917.
Examination and surveys	$5,405.96	$46,660.88
Storage works:		
Mission division	83,656.47	97,945.16
Post division	25,187.92	145,048.21
Crow division	.....	1,030.00
Pablo division	1,874.57	230,020.90
Polson	.....	490.16
Camas division	20,481.93	21,628.65
	131,200.89	496,163.08
Canal system:		
Pablo division	479.27	254,850.30
Camas division	116,257.14	116,257.14
	116,736.41	371,107.44
Lateral system:		
Jocko division	11,227.05	157,013.15
Mission division	17,596.60	88,032.38
Post division	64,477.82	184,043.51
Moiese division	49,041.68	215,151.26
Crow division	.....	5,500.00
Pablo division	146,103.83	374,671.23
Valley View division	50,363.15	149,475.19
Polson division	.....	15,446.12
Camas division	22,289.69	23,477.57
	361,099.82	1,212,810.41
Drainage system: Polson division	26,589.07	50,188.13
Power system: Polson division, Newell tunnel	.....	101,685.11
Farm units: Project as a whole	.....	15,346.31
Permanent improvements:		
Headquarters	.....	4,040.00
Mission division	.....	10,118.49
Post division	5,047.37	5,474.35
Moiese division	1,533.93	1,858.83
Pablo division	.....	7.50
Camas division	6,845.79	6,845.79
	13,427.09	28,344.96
Telephone system: Project as a whole	8,406.39	16,851.77
Operation and maintenance during construction (water-rental basis)	29,562.42	127,850.62
Plant accounts	80,266.15	106,943.81
Undistributed clearing accounts	[1] 5,580.20	[1] 5,580.20
Gross construction cost to June 30, 1917	767,114.00	2,568,372.32
Less revenues earned during construction period:		
Rental of buildings	2,999.74	6,555.21
Rental of grazing and farming lands	432.00	1,242.75
Rentals of irrigation water	6,181.72	35,856.74
Rentals of telephones and tolls	532.32	5,637.28
Contractors' freight refunds	532.86	2,604.90
Forfeitures by defaulting bidders and contractors	840.00	1,830.00
Other revenues, unclassified	459.26	803.45
Profit on mess-house operation	[1] 11,282.17	815.34
Profit on mercantile store operation	765.23	9,290.73
Profit on hospital operation	1,608.81	2,755.60
	3,069.77	67,392.00
Net cost of construction of project to June 30, 1917	.....	2,500,980.32

[1] Deduct.

Statement of cost by calendar years, Flathead project.

Year ending Dec. 31—	Construction.	Operation and maintenance during construction.	Total cost.
1908	$25,303.90		$25,303.90
1909	149,160.88		149,160.88
1910	242,779.63		242,779.63
1911	416,550.60	$4,719.97	421,270.57
1912	211,971.63	8,614.63	220,586.26
1913	166,360.35	18,789.00	185,149.35
1914	186,724.49	24,423.08	211,147.57
1915	156,159.17	29,061.80	185,220.97
1916	379,881.65	28,774.13	408,655.78
January to June 30, 1917	404,265.79	13,468.01	417,733.80
Plant and clearing accounts to June 30, 1917	101,363.61		101,363.61
Total	2,440,521.70	127,850.62	2,568,372.32

Statement of cost by fiscal years, Flathead project.

Year ending June 30—	Construction.	Operation and maintenance during construction.	Total cost.
1908	$3,347.89		$3,347.89
1909	66,571.91		66,571.91
1910	185,377.41		185,377.41
1911	341,840.64		341,840.64
1912	341,334.95	$8,148.67	349,483.62
1913	162.105.21	14,075.25	176,180.46
1914	243,227.82	19,849.42	263,077.24
1915	104,257.28	28,860.76	133,118.04
1916	228,229.35	27,354.10	255,583.45
1917	737,551.58	29,562.42	767,114.00
Plant and clearing account to June 30, 1916	26,677.66		26,677.66
Total	2,440,521.70	127,850.62	2,568,372.32

Estimated cost of contemplated work during fiscal year 1918, Fathead project.

Features.	Sub-feature.	Principal feature.
Examination and surveys		$6,000
Storage:		
South Pablo	$46,000	
Hubbart	263,000	
Tabor	25,000	
		334,000
Canal systems:		
Camas Main Canal	10,000	
Pablo Feeder Canal	100,000	
		110,000
Lateral systems:		
Camas	70,000	
Jocko division	37,000	
Post laterals	80,000	
		187,000
Drainage works		10,000
Permanent improvements		5,000
Telephone system		5,000
Operation and maintenance during construction		50,000
Stores and other operations		5,700
Plant and equipment		37,300
Total		750,000

MONTANA, FORT PECK (INDIAN) PROJECT.

R. M. Conner, project manager, Poplar, Mont.

LOCATION.

Counties: Valley, Sheridan.
Townships: 26 to 33 N., Rs. 39 to 56 E., Montana meridian.
Railroad: Great Northern.
Railroad stations and estimated population January 1, 1917: Wiota;[1] Kintyre;[1] Frazer, 50; Oswego, 300; Lohmiller;[1] Wolf Point, 900; Chelsea;[1] Poplar, 1,200; Sprole;[1] Brockton, 250; Calais;[1] and Blair.[1]

WATER SUPPLY.

Source of water supply: Missouri and Poplar Rivers; Little Porcupine, Big Porcupine, Wolf, Smoke, and Big Muddy Creeks.
Area of drainage basins: Missouri River, 85,000 square miles; Poplar River, 3,000 square miles; Big Porcupine Creek, 683 square miles.
Annual run-off in acre-feet (1909–1916): Poplar River, mean, 84,000; Big Porcupine Creek, mean, 19,370; Little Porcupine Creek, mean, 5,880; Wolf Creek at Wolf Point, mean, 5,360; Big Muddy Creek near Culbertson, mean, 34,300.

AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which service is prepared to supply water, season of 1917: Little Porcupine unit, 2,330 acres; Poplar River unit, 10,290 acres. Big Porcupine unit, 4,000 acres.
Area irrigated, season of 1917: 550 acres to June 30, 1917.
Length of irrigating season: From April 1 to August 31, 153 days.
Average elevation of irrigable area: 2,000 feet above sea level.
Rainfall on irrigable area: 1886 to 1916, average, 13.68 inches; 1916, 14.25 inches.
Range of temperature on irrigable area: −40° to 100° F.
Character of soil of irrigable area: Heavy clay and loam.
Principal products: Hay, grain, and vegetables.
Principal markets: Local and Minneapolis and St. Paul.

LAND OPEN FOR IRRIGATION.

In the construction of the systems laterals are being constructed to the allotted areas only. The work of allotting has been completed, but a few changes are being made. The allotted area in each unit is as follows: Big Porcupine, 6,400 acres; Little Porcupine, 2,330 acres; Missouri River, 38,000 acres; Poplar River, 11,600 acres; Big Muddy, 12,900 acres. Under the Poplar River 200 acres of land under the canals have been sold to whites.

CHRONOLOGICAL SUMMARY.

Reconnoissance and preliminary surveys made in 1908.
Little Porcupine unit completed to allotted irrigable area in July, 1911.
Poplar River unit completed to allotted irrigable area of 7,890 acres in 1916.
Big Porcupine unit completed to 4,000 acres of allotted land, June, 1917.
Entire project 10.4 per cent completed June 30, 1917.

IRRIGATION PLAN.

The irrigation plan for the Fort Peck project provides, in so far as the water supply is found sufficient, for the irrigation of lands in various parts of the Fort Peck Indian Reservation and adjacent territory as follows: (1) 4,000 acres in the vicinity of Wiota station, with flood waters from Big Porcupine Creek; (2) 2,000 acres in the vicinity of

[1] Population less than 25.

Frazer, with water supply from Little Porcupine Creek conserved by storage; (3) 28,000 acres in the vicinity of Poplar and extending along Poplar River a distance of 35 miles, with water supply from Poplar River conserved by storage below the forks of Poplar and West Branch; (4) 16,000 acres lying along the west side of Big Muddy Creek, with water supply from Big Muddy Creek conserved by storage on Smoke and Wolf Creeks; (5) 50,000 acres of clear bench land and approximately 34,000 acres of brush and timber land extending along the Missouri River, with water supply from the Missouri River by a gravity canal heading near the site of old Fort Peck; (6) 10,000 acres, known as the Galpin Bottom, lying above the Missouri River Canal west of Milk River and Fort Peck Indian Reservation, with water supply by pumping from the Missouri River Canal, with a lift of about 20 feet; (7) 8,000 acres lying above the Missouri River Canal, east of Milk River, in the Fort Peck Indian Reservation, with water supply from pumping from the Missouri River Canal, with a lift of from 10 to 20 feet. The United States claims all waste, seepage, spring, and percolating water arising within the project and proposes to use such water in connection therewith.

The Little Porcupine unit, with storage reservoir of 3,900 acre-feet capacity, has been completed to irrigate 2,330 acres. Poplar River West Canal B has been completed to irrigate 2,560 acres of allotted area, and Poplar River East Canal C to irrigate 5,330 acres of allotted land. The Big Porcupine Creek Canal, to irrigate 4,000 acres of allotted land on the west boundary of the reservation, has been completed, and a reservoir of 3,800 acre-feet capacity on the Middle Fork of Big Porcupine Creek to serve this area is 25 per cent completed.

It is proposed during the next fiscal year to complete the reservoir on the Middle Fork of Big Porcupine Creek; to extend the lateral system under the Poplar River unit to new allotments; to investigate Poplar River and Big Muddy Creek unit Reservoirs; and to begin construction of canals on Big Muddy unit. Future work will include the completion of Big Muddy unit, together with its storage reservoirs on Smoke Creek and Wolf Creek; the construction of a reservoir on Poplar River; and the construction of the Missouri River Canal to irrigate 37,900 acres of allotted land along the Missouri River and adjacent to the Great Northern Railway, where the larger percentage of Indians have their homes.

SUMMARY OF GENERAL DATA FOR FORT PECK PROJECT TO END OF FISCAL YEAR 1917.

Areas:		
Irrigable acreage when project is complete		152,000
Public land entered to end of fiscal year	9,713	
Public land open to entry at end of fiscal year	107	
State land	180	
Indian land	141,800	
Private land	200	
Acreage service could have supplied season of 1916		12,620
Addition in fiscal year 1917		4,000
Estimated acreage service can supply July 1, 1918		16,620
Acreage actually irrigated, season of 1916		1,092
Acreage cropped under irrigation, season of 1916		1,092
Crops:		
Value of irrigated crops, season of 1916		$10,926.00
Value of irrigated crops per acre cropped		$10.00
Finances:		
Gross construction cost to end of fiscal year		$559,621.46
Per cent complete at end of fiscal year		10.4
Appropriated for fiscal year 1918, total		$100,000.00
Allotment for construction, fiscal year 1918		$107,000.00
Estimated per cent complete, June 30, 1918		12
Proposed appropriation, fiscal year 1919, for construction		$150,000.00
Estimated gross construction expenditures to June 30, 1919		$816,621.46
Estimated per cent complete, June 30, 1919		15
Appropriation, fiscal year 1917		[1] $100,291.02

[1] Includes refunds authorized to be added to 1917 appropriation.

Finances—Continued.		
Expenditures during fiscal year chargeable to 1917 appropriation—		
Disbursements	$85,584.10	
Registered liabilities chargeable to 1917 appropriation	12,809.08	
		$98,393.18
Unencumbered balance, July 1, 1917		1,897.84

CONSTRUCTION DURING FISCAL YEAR.

Construction for the fiscal year 1917 included installation of gates and backfilling of small structures on Big Porcupine unit, the construction of spillway and outlet works and placing of embankment for Big Porcupine storage dam, revision of canal and extension of lateral system of Poplar River unit, and construction of drop in Little Porcupine Diversion Canal.

ECONOMIES OF GOVERNMENT WORK.

In the construction of minor structures, such as farm and lateral turnouts and culverts, a large amount of concrete pipe has been manufactured locally at about the following prices per foot, including cement: 15-inch, 40 to 50 cents; 18-inch, 55 to 75 cents; 24-inch, 75 cents to $1.01; 30-inch, $1.36; 36-inch, $1.30 to $1.66. This pipe was made by the wet process, which results in a pipe much superior to that made by the dry process.

OPERATION AND MAINTENANCE.

During the spring of 1916 the excessive run-off from the areas above the canals caused considerable damage to the canal banks, but as soon as the canals could be put into operation delivery of water was begun. A total of 1,092 acres was irrigated during the season.

For the year 1917 the rainfall to June 30 totaled 4.22 inches, or 3.72 inches less than the average for that period for the previous 30 years of record, May and June alone falling 2.69 inches below the average for those two months, and as a consequence there was considerable demand for water, particularly on Little Porcupine and Poplar River units. For Little Porcupine unit there was an abundance of water available in the reservoir, and 440 acres were under irrigation to June 30. On the Poplar River only a small amount of land had been irrigated to June 30, due to breaks in the canals and shortage of water in the river.

Historical review, Fort Peck project.

Item.	1913	1914	1915	1916	1917
Acreage for which service was prepared to supply water	4,970	10,220	12,620	12,620	16,620
Acreage irrigated	410	1,004	1,100	1,092	[1] 1,092
Miles of canals operated	30	85	85	85	90
Water diverted (acre-feet)	800	2,000	3,000	3,500	[1] 2,500
Water delivered to land (acre-feet)	800	2,000	1,560	2,250	[1] 1,500
Per acre of land irrigated (acre-feet)	1.9	2.0	1.42	1.5	[1] 1.2

[1] Estimated.

SETTLEMENT.

In the spring of 1914 the unallotted grazing land on the reservation was opened to entry through a drawing in September, 1913. The settlement of this land was relatively slow during 1914 and 1915, but during the spring of 1916 a large number of entries were made, the desirable land being well taken up. In the spring of 1917, about 220,000 acres of unallotted land, previously withheld as mineral, was authorized to be appraised and opened for entry. Some of the Indians have received title to their land and a number of irrigable allotments have changed hands at prices ranging from $30 to $40 per acre. On the Poplar River unit, some of the Indians are moving onto their allotments and establishing homes.

Settlement data, Fort Peck project.

Item.	1913	1914	1915	1916	1917
Total number of allotments on project (irrigable)		1,780	1,780	1,780	[1] 1,780
Population (Indians)	1,991	1,991	2,046	2,092	[1] 2,130
Number of irrigated farms	18	29	42	48	[1] 60
Operated by owners or managers	18	26	40	46	[1] 55
Operated by tenants		3	2	2	[1] 5
Population	50	70	110	130	[1] 200
Number of towns	5	5	5	5	5
Population, white	980	1,440	1,780	2,200	2,650
Total population in towns and on farms	2,971	3,431	3,826	4,292	[1] 4,780
Number of schools:					
Indian	5	5	5	5	5
White	1	2	3	5	5
Number of churches	5	6	7	7	8
Number of banks	3	4	5	4	6
Total capital stock	$65,000	$85,000	$105,000	$110,000	$130,000
Total amount of deposits	$160,000	$223,000	$234,000	$477,000	$580,000
Total number of depositors	900	1,250	1,400	1,970	2,630

[1] Estimated.

PRINCIPAL CROPS.

The principal crops are oats, wheat, flax, vegetables, and bluejoint hay. Some of the Indians are turning their attention to alfalfa and several have sown small acreages on their irrigable allotments. Increased areas are farmed each year under both irrigation and dry farming. The greater number of the Indians have their homes along the Missouri River on land not yet under irrigation, and on which most of their farming is done. With favorable weather conditions good crops can be raised on this area by dry farming methods, but results for the past three years have been rather disappointing so that more of the Indians have been turning their attention to the irrigable land on Little Porcupine and Poplar River units.

Crop report, Fort Peck (Indian) project, 1916.

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa	6	Tons	6	1.00	$10.00	$60.00	$10.08
Flax	54	Bushels	384	7.10	2.50	960.00	17.70
Garden	7					313.00	44.71
Hay	712	Tons	544	.77	8.00	4,357.00	6.12
Oats	47	Bushels	1,440	30.60	.35	504.00	10.72
Pasture	85					460.00	5.41
Potatoes	2	Bushels	166	83.00	1.50	249.00	124.50
Timothy	3	Tons	3	1.00	8.00	24.00	8.00
Wheat	176	Bushels	2,666	15.10	1.50	3,999.00	22.72
Total irrigated and cropped	1,092						
Total and average						10,926.00	10.00

FINANCIAL STATEMENT.

[Financial statement in detail, showing assets, liabilities, reserves, and capital, given in appendix, p. 538.]

Feature costs of Fort Peck project to June 30, 1917.

Features.	Cost.	
	Fiscal year 1917.	To end of fiscal year 1917.
Examination and surveys	$4,133.46	$36,267.43
Storage works	19,904.95	
Little Porcupine unit		29,663.09
Big Porcupine unit		19,113.96
		48,777.05
Canal system	8,078.38	
Poplar River unit		212,365.15
Big Porcupine unit		64,676.43
Big Muddy unit		595.27
		277,636.85
Lateral system	20,408.43	
Little Porcupine unit		24,210.48
Poplar River unit		54,776.59
Big Porcupine unit		73,357.95
Big Muddy unit		470.67
		152,815.69
Permanent improvements: Project buildings		7,737.20
Operation and maintenance during construction (water-rental basis)	8,682.68	23,267.23
Plant accounts	2,549.94	13,120.01
Gross construction cost to June 30, 1917	63,757.84	559,621.46
Less revenues earned during construction period:		
Rental of buildings	[1] 720.80	383.51
Other revenues (lodging)	1,059.55	1,059.55
Profit on farming operations	[1] 469.40	[1] 469.40
Profit on messhouse operations	[1] 516.67	[1] 951.24
Profit on mercantile store operations	401.06	9,537.94
Profit on hospital operations	161.90	570.24
	[1] 84.36	10,130.60
Net cost of construction of project to June 30, 1917		549,490.86

[1] Deduct.

Statement of cost by calendar years, Fort Peck project.

Year ending Dec. 31—	Construction.	Operation and maintenance during construction.	Total cost.
1908	$7,019.16		$7,019.16
1909	32,821.37		32,821.37
1910	85,382.50		85,382.50
1911	70,127.23		70,127.23
1912	17,110.85	$823.07	17,933.92
1913	117,299.74	2,410.22	119,709.96
1914	104,293.99	5,863.03	110,157.02
1915	26,645.61	2,113.23	28,758.84
1916	31,623.33	5,501.69	37,125.02
Jan. 1 to June 30, 1917	30,910.44	6,555.99	37,466.43
Plant accounts to June 30, 1917	13,120.01		13,120.01
Total	536,354.23	23,267.23	559,621.46

Statement of cost by fiscal years, Fort Peck project.

Year ending June 30—	Construction.	Operation and maintenance during construction.	Total cost.
1909	$12,548.37		$12,548.37
1910	50,705.86		50,705.86
1911	117,180.84		117,180.84
1912	16,466.80	$188.89	16,655.69
1913	73,892.56	1,775.86	75,668.42
1914	109,713.74	3,984.28	113,698.02
1915	58,999.93	3,723.77	62,723.70
1916	31,200.90	4,911.75	36,112.65
1917	55,075.16	8,682.68	63,757.84
Plant accounts to June 30, 1916	10,570.07		10,570.07
Total	536,354.23	23,267.23	559,621.46

Estimated cost of contemplated work, Fort Peck project, during fiscal year 1918.

Features.	Estimated expenditures during fiscal year 1918.	
	Subfeature.	Principal feature.
Examination and surveys		$5,500.00
Storage works:		
Poplar River unit	$5,000.00	
Big Porcupine unit	45,000.00	
		50,000.00
Canal system: Big Muddy unit		36,000.00
Lateral system:		
Poplar River unit	2,500.00	
Big Porcupine unit	1,000.00	
		3,500.00
Telephone system		2,000.00
Operation and maintenance during construction (water-rental basis)		10,000.00
Stores and other operations		3,000.00
Plant and equipment		5,000.00
Total		115,000.00

APPENDIX.

LEGISLATION.

RECLAMATION ACT.

An act appropriating the receipts from the sale and disposal of public lands in certain States and Territories to the construction of irrigation works for the reclamation of arid lands.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That all moneys received from the sale and disposal of public lands in Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington, and Wyoming, beginning with the fiscal year ending June thirtieth, nineteen hundred and one, including the surplus of fees and commissions in excess of allowances to registers and receivers, and excepting the five per centum of the proceeds of the sales of public lands in the above States set aside by law for educational and other purposes, shall be, and the same are hereby, reserved, set aside, and appropriated as a special fund in the Treasury to be known as the "reclamation fund," to be used in the examination and survey for the construction and maintenance of irrigation works for the storage, diversion, and development of waters for the reclamation of arid and semiarid lands in the said States and Territories, and for the payment of all other expenditures provided for in this act: *Provided,* That in case the receipts from the sale and disposal of public lands other than those realized from the sale and disposal of lands referred to in this section are insufficient to meet the requirements for the support of agricultural colleges in the several States and Territories, under the act of August thirtieth, eighteen hundred and ninety, entitled "An act to apply a portion of the proceeds of the public lands to the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts, established under the provisions of an act of Congress approved July second, eighteen hundred and sixty-two," the deficiency, if any, in the sum necessary for the support of the said colleges shall be provided for from any moneys in the Treasury not otherwise appropriated.

SEC. 2. That the Secretary of the Interior is hereby authorized and directed to make examinations and surveys for, and to locate and construct, as herein provided, irrigation works for the storage, diversion, and development of waters, including artesian wells, and to report to Congress at the beginning of each regular session as to the results of such examinations and surveys, giving estimates of cost of all contemplated works, the quantity and location of the lands which can be irrigated therefrom, and all facts relative to the practicability of each irrigation project; also the cost of works in process of construction as well as of those which have been completed.

SEC. 3. That the Secretary of the Interior shall, before giving the public notice provided for in section four of this act, withdraw from public entry the lands required for any irrigation works contemplated under the provisions of this act, and shall restore to public entry any of the lands so withdrawn when, in his judgment, such lands are not required for the purposes of this act; and the Secretary of the Interior is hereby authorized, at or immediately prior to the time of beginning the surveys for any contemplated irrigation works, to withdraw from entry, except under the homestead laws, any public lands believed to be susceptible of irrigation from said works: *Provided*, That all lands entered and entries made under the homestead laws within areas so withdrawn during such withdrawal shall be subject to all the provisions, limitations, charges, terms, and conditions of this act; that said surveys shall be prosecuted diligently to completion, and upon the completion thereof, and of the necessary maps, plans, and estimates of cost, the Secretary of the Interior shall determine whether or not said project is practicable and advisable, and if determined to be impracticable or unadvisable he shall thereupon restore said lands to entry; that public lands which it is proposed to irrigate by means of any contemplated works shall be subject to entry only under the provisions of the homestead laws in tracts of not less than forty nor more than one hundred and sixty acres, and shall be subject to limitations, charges, terms, and conditions herein provided: *Provided*, That the commutation provisions of the homestead laws shall not apply to entries made under this act.

SEC. 4. That upon the determination by the Secretary of the Interior that any irrigation project is practicable, he may cause to be let contracts for the construction of the same, in such portions or sections as it may be practicable to construct and complete as parts of the whole project, providing the necessary funds for such portions or sections are available in the reclamation fund, and thereupon he shall give public notice of the lands irrigable under such project, and limit of area per entry, which limit shall represent the acreage which, in the opinion of the Secretary, may be reasonably required for the support of a family upon the lands in question; also of the charges which shall be made per acre upon the said entries, and upon lands in private ownership which may be irrigated by the waters of the said irrigation project, and the number of annual installments, not exceeding ten, in which such charges shall be paid, and the time when such payments shall commence. The said charges shall be determined with a view of returning to the reclamation fund the estimated cost of construction of the project, and shall be apportioned equitably: *Provided*, That in all construction work eight hours shall constitute a day's work, and no Mongolian labor shall be employed thereon.

SEC. 5.[1] That the entryman upon lands to be irrigated by such works shall, in addition to compliance with the homestead laws, reclaim at least one-half of the total irrigable area of his entry for agricultural purposes, and before receiving patent for the lands covered by his entry shall pay to the Government the charges apportioned against such tract, as provided in section four. No right to the use of water for land in private ownership shall be sold for a tract

[1] Sec. 5. Manner of payments, amended by act of Aug. 9, 1912 (37 Stat., 265).

exceeding one hundred and sixty acres to any one landowner, and no such sale shall be made to any landowner unless he be an actual bona fide resident on such land, or occupant thereof residing in the neighborhood of said land, and no such right shall permanently attach until all payments therefor are made. The annual installments shall be paid to the receiver of the local land office of the district in which the land is situated, and a failure to make any two payments when due shall render the entry subject to cancellation, with the forfeiture of all rights under this act, as well as of any moneys already paid thereon. All moneys received from the above sources shall be paid into the reclamation fund. Registers and receivers shall be allowed the usual commissions on all moneys paid for lands entered under this act.

SEC. 6. That the Secretary of the Interior is hereby authorized and directed to use the reclamation fund for the operation and maintenance of all reservoirs and irrigation works constructed under the provisions of this act: *Provided*, That when the payments required by this act are made for the major portion of the lands irrigated from the waters of any of the works herein provided for, then the management and operation of such irrigation works shall pass to the owners of the lands irrigated thereby, to be maintained at their expense under such form of organization and under such rules and regulations as may be acceptable to the Secretary of the Interior: *Provided*, That the title to and the management and operation of the reservoirs and the works necessary for their protection and operation shall remain in the Government until otherwise provided by Congress.

SEC. 7. That where in carrying out the provisions of this act it becomes necessary to acquire any rights or property, the Secretary of the Interior is hereby authorized to acquire the same for the United States by purchase or by condemnation under judicial process, and to pay from the reclamation fund the sums which may be needed for that purpose, and it shall be the duty of the Attorney General of the United States, upon every application of the Secretary of the Interior under this act, to cause proceedings to be commenced for condemnation within thirty days from the receipt of the application at the Department of Justice.

SEC. 8. That nothing in this act shall be construed as affecting or intended to affect or to in any way interfere with the laws of any State or Territory relating to the control, appropriation, use, or distribution of water used in irrigation, or any vested right acquired thereunder, and the Secretary of the Interior, in carrying out the provisions of this act, shall proceed in conformity with such laws, and nothing herein shall in any way affect any right of any State or of the Federal Government or of any landowner, appropriator, or user of water in, to, or from any interstate stream or the waters thereof: *Provided*, That the right to the use of water acquired under the provisions of this act shall be appurtenant to the land irrigated and beneficial use shall be the basis, the measure, and the limit of the right.

SEC. 9.[1] That it is hereby declared to be the duty of the Secretary of the Interior in carrying out the provisions of this act, so far as

[1] Sec. 9 repealed by act of June 25, 1910 (36 Stat., 835).

the same may be practicable and subject to the existence of feasible irrigation projects, to expend the major portion of the funds arising from the sale of public lands within each State and Territory hereinbefore named for the benefit of arid and semiarid lands within the limits of such State or Territory: *Provided*, That the Secretary may temporarily use such portion of said funds for the benefit of arid or semiarid lands in any particular State or Territory hereinbefore named as he may deem advisable, but when so used the excess shall be restored to the fund as soon as practicable, to the end that ultimately, and in any event within each ten-year period after the passage of this act, the expenditures for the benefit of the said States and Territories shall be equalized according to the proportions and subject to the conditions as to practicability and feasibility aforesaid.

SEC. 10. That the Secretary of the Interior is hereby authorized to perform any and all acts and to make such rules and regulations as may be necessary and proper for the purpose of carrying the provisions of this act into full force and effect.

Approved, June 17, 1902 (32 Stat., 388).

RECLAMATION EXTENSION ACT.

An act extending the period of payment under reclamation projects, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That any person whose lands hereafter become subject to the terms and conditions of the act approved June seventeenth, nineteen hundred and two, entitled "An act appropriating the receipts from the sale and disposal of public lands in certain States and Territories to the construction of irrigation works for the reclamation of arid lands," and acts amendatory thereof or supplementary thereto, hereafter to be referred to as the reclamation law, and any person who hereafter makes entry thereunder, shall at the time of making water-right application or entry, as the case may be, pay into the reclamation fund five per centum of the construction charge fixed for his land as an initial installment, and shall pay the balance of said charge in fifteen annual installments, the first five of which shall each be five per centum of the construction charge and the remainder shall each be seven per centum until the whole amount shall have been paid. The first of the annual installments shall become due and payable on December first of the fifth calendar year after the initial installment: *Provided*, That any water-right applicant or entryman may, if he so elects, pay the whole or any part of the construction charges owing by him within any shorter period: *Provided further*, That entry may be made whenever water is available, as announced by the Secretary of the Interior, and the initial payment be made when the charge per acre is established.

ACT SHALL APPLY TO EXISTING PROJECTS.

SEC. 2. That any person whose land or entry has heretofore become subject to the terms and conditions of the reclamation law shall pay the construction charge, or the portion of the construction charge remaining unpaid, in twenty annual installments, the first of which

shall become due and payable on December first of the year in which the public notice affecting his land is issued under this act, and subsequent installments on December first of each year thereafter. The first four of such installments shall each be two per centum, the next two installments shall each be four per centum, and the next fourteen each six per centum of the total construction charge, or the portion of the construction charge unpaid at the beginning of such installments.

PENALTIES.

SEC. 3. That if any water-right applicant or entryman shall fail to pay any installment of his construction charges when due, there shall be added to the amount unpaid a penalty of one per centum thereof, and there shall be added a like penalty of one per centum of the amount unpaid on the first day of each month thereafter so long as such default shall continue. If any such applicant or entryman shall be one year in default in the payment of any installment of the construction charges and penalties, or any part thereof, his water-right application, and if he be a homestead entryman his entry also, shall be subject to concellation, and all payments made by him forfeited to the reclamation fund, but no homestead entry shall be subject to contest because of such default: *Provided*, That if the Secretary of the Interior shall so elect, he may cause suit or action to be brought for the recovery of the amount in default and penalties; but if suit or action be brought, the right to declare a cancellation and forfeiture shall be suspended pending such suit or action.

INCREASE OF CHARGES.

SEC. 4. That no increase in the construction charges shall hereafter be made, after the same have been fixed by public notice, except by agreement between the Secretary of the Interior and a majority of the water-right applicants and entrymen to be affected by such increase, whereupon all water-right applicants and entrymen in the area proposed to be affected by the increased charge shall become subject thereto. Such increased charge shall be added to the construction charge and payment thereof distributed over the remaining unpaid installments of construction charges: *Provided*, That the Secretary of the Interior, in his discretion, may agree that such increased construction charge shall be paid in additional annual installments, each of which shall be at least equal to the amount of the largest installment as fixed for the project by the public notice theretofore issued. And such additional installments of the increased construction charge, as so agreed upon, shall become due and payable on December first of each year subsequent to the year when the final installment of the construction charge under such public notice is due and payable: *Provided further*, That all such increased construction charges shall be subject to the same conditions, penalties, and suit or action as provided in section three of this act.

OPERATION AND MAINTENANCE.

SEC. 5. That in addition to the construction charge, every water-right applicant, entryman, or landowner under or upon a reclamation project shall also pay, whenever water service is available

for the irrigation of his land, an operation and maintenance charge based upon the total cost of operation and maintenance of the project, or each separate unit thereof, and such charge shall be made for each acre-foot of water delivered; but each acre of irrigable land, whether irrigated or not, shall be charged with a minimum operation and maintenance charge based upon the charge for delivery of not less than one acre-foot of water: *Provided*, That whenever any legally organized water users' association or irrigation district shall so request, the Secretary of the Interior is hereby authorized, in his discretion, to transfer to such water users' association or irrigation district the care, operation, and maintenance of all or any part of the project works, subject to such rules and regulations as he may prescribe. If the total amount of operation and maintenance charges and penalties collected for any one irrigation season on any project shall exceed the cost of operation and maintenance of the project during that irrigation season, the balance shall be applied to a reduction of the charge on the project for the next irrigation season, and any deficit incurred may likewise be added to the charge for the next irrigation season.

PENALTIES.

SEC. 6. That all operation and maintenance charges shall become due and payable on the date fixed for each project by the Secretary of the Interior, and if such charge is paid on or before the date when due there shall be a discount of five per centum of such charge; but if such charge is unpaid on the first day of the third calendar month thereafter, a penalty of one per centum of the amount unpaid shall be added thereto, and thereafter an additional penalty of one per centum of the amount unpaid shall be added on the first day of each calendar month if such charge and penalties shall remain unpaid, and no water shall be delivered to the lands of any water-right applicant or entryman who shall be in arrears for more than one calendar year for the payment of any charge for operation and maintenance, or any annual construction charge and penalties. If any water-right applicant or entryman shall be one year in arrears in the payment of any charge for operation and maintenance and penalties, or any part thereof, his water-right application, and if he be a homestead entryman his entry also, shall be subject to cancellation, and all payments made by him forfeited to the reclamation fund, but no homestead entry shall be subject to contest because of such arrears. In the discretion of the Secretary of the Interior suit or action may be brought for the amounts in default and penalties in like manner as provided in section three of this act.

FISCAL AGENT.

SEC. 7. That the Secretary of the Interior is hereby authorized, in his discretion, to designate and appoint, under such rules and regulations as he may prescribe, the legally organized water users' association or irrigation district, under any reclamation project, as the fiscal agent of the United States to collect the annual payments on the construction charge of the project and the annual charges for operation and maintenance and all penalties: *Provided*, That no

water-right applicant or entryman shall be entitled to credit for any payment thus made until the same shall have been paid over to an officer designated by the Secretary of the Interior to receive the same.

RECLAMATION REQUIREMENTS.

SEC. 8. That the Secretary of the Interior is hereby authorized to make general rules and regulations governing the use of water in the irrigation of the lands within any project, and may require the reclamation for agricultural purposes and the cultivation of one-fourth the irrigable area under each water-right application or entry within three full irrigation seasons after the filing of water-right application or entry, and the reclamation for agricultural purposes and the cultivation of one-half the irrigable area within five full irrigation seasons after the filing of the water-right application or entry, and shall provide for continued compliance with such requirements. Failure on the part of any water-right applicant or entryman to comply with such requirements shall render his application or entry subject to cancellation.

LANDS NOT SUBJECT TO RECLAMATION ACT.

SEC. 9. That in all cases where application for water right for lands in private ownership or lands held under entries not subject to the reclamation law shall not be made within one year after the passage of this act, or within one year after notice issued in pursuance of section four of the reclamation act, in cases where such notice has not heretofore been issued, the construction charges for such land shall be increased five per centum each year until such application is made and an initial installment is paid.

WITHDRAWN LANDS SUBJECT TO ENTRY.

SEC. 10. That the act of Congress approved February eighteenth, nineteen hundred and eleven, entitled "An act to amend section five of the act of Congress of June twenty-fifth, nineteen hundred and ten, entitled 'An act to authorize advances to the reclamation fund, and for the issuance and disposal of certificates of indebtedness in reimbursement therefor, and for other purposes,'" be, and the same hereby is, amended so as to read as follows:

"SEC. 5. That no entry shall be hereafter made and no entryman shall be permitted to go upon lands reserved for irrigation purposes until the Secretary of the Interior shall have established the unit of acreage per entry, and water is ready to be delivered for the land in such unit or some part thereof and such fact has been announced by the Secretary of the Interior: *Provided*, That where entries made prior to June twenty-fifth, nineteen hundred and ten, have been or may be relinquished, in whole or in part, the lands so relinquished shall be subject to settlement and entry under the reclamation law."

WATER SERVICE.

SEC. 11. That whenever water is available and it is impracticable to apportion operation and maintenance charges as provided in section five of this act, the Secretary of the Interior may, prior to giving

public notice of the construction charge per acre upon land under any project, furnish water to any entryman or private landowner thereunder until such notice is given, making a reasonable charge therefor, and such charges shall be subject to the same penalties and to the provisions for cancellation and collection as herein provided for other operation and maintenance charges.

ADMISSION OF PRIVATE LANDOWNERS TO NEW PROJECTS.

SEC. 12. That before any contract is let or work begun for the construction of any reclamation project hereafter adopted the Secretary of the Interior shall require the owners of private lands thereunder to agree to dispose of all lands in excess of the area which he shall deem sufficient for the support of a family upon the land in question, upon such terms and at not to exceed such price as the Secretary of the Interior may designate; and if any landowner shall refuse to agree to the requirements fixed by the Secretary of the Interior, his land shall not be included within the project if adopted for construction.

DISPOSITION OF EXCESS FARM UNITS.

SEC. 13. That all entries under reclamation projects containing more than one farm unit shall be reduced in area and conformed to a single farm unit within two years after making proof of residence, improvement, and cultivation, or within two years after the issuance of a farm-unit plat for the project, if the same issues subsequent to the making of such proof: *Provided,* That such proof is made within four years from the date as announced by the Secretary of the Interior that water is available for delivery for the land. Any entryman failing within the period herein provided to dispose of the excess of his entry above one farm unit, in the manner provided by law, and to conform his entry to a single farm unit shall render his entry subject to cancellation as to the excess above one farm unit: *Provided,* That upon compliance with the provisions of law such entryman shall be entitled to receive a patent for that part of his entry which conforms to one farm unit as established for the project: *Provided further,* That no person shall hold by assignment more than one farm unit prior to final payment of all charges for all the land held by him subject to the reclamation law, except operation and maintenance charges not then due.

ACCEPTANCE OF THIS ACT.

SEC. 14. That any person whose land or entry has heretofore become subject to the reclamation law, who desires to secure the benefits of the extension of the period of payments provided by this act, shall, within six months after the issuance of the first public notice hereunder affecting his land or entry, notify the Secretary of the Interior, in the manner to be prescribed by said Secretary, of his acceptance of all of the terms and conditions of this act, and thereafter his lands or entry shall be subject to all of the provisions of this act.

SEC. 15. That the Secretary of the Interior is hereby authorized to perform any and all acts and to make such rules and regulations as

may be necessary and proper for the purpose of carrying the provisions of this act into full force and effect.

SEC. 16. That from and after July first, nineteen hundred and fifteen, expenditures shall not be made for carrying out the purposes of the reclamation law except out of appropriations made annually by Congress therefor, and the Secretary of the Interior shall, for the fiscal year nineteen hundred and sixteen, and annually thereafter, in the regular Book of Estimates, submit to Congress estimates of the amount of money necessary to be expended for carrying out any or all of the purposes authorized by the reclamation law, including the extension and completion of existing projects and units thereof and the construction of new projects. The annual appropriations made hereunder by Congress for such purposes shall be paid out of the reclamation fund provided for by the reclamation law.

Approved, August 13, 1914 (38 Stat., 686).

APPROPRIATION FOR UNITED STATES RECLAMATION SERVICE, FISCAL YEAR 1918.

The following is the appropriation for the Reclamation Service for the fiscal year 1918, beginning July 1, 1917, and ending June 30, 1918, as found in the sundry civil appropriation act approved June 12, 1917:

RECLAMATION SERVICE.

The following sums are appropriated out of the special fund in the Treasury of the United States created by the act of June seventeenth, nineteen hundred and two, and therein designated "the reclamation fund."

For all expenditures authorized by the act of June seventeenth, nineteen hundred and two (Thirty-second Statutes, page three hundred and eighty-eight), and acts amendatory thereof and supplementary thereto, known as the reclamation law, and all other acts under which expenditures from said fund are authorized, including salaries in the city of Washington and elsewhere; rent of office quarters in the city of Washington, $8,040, and for rent elsewhere; examination of estimates for appropriations in the field; printing and binding; law books, books of reference, periodicals, engineering and statistical publications, not exceeding $1,500; purchase, maintenance, and operation of horse-drawn or motor-propelled passenger carrying vehicles; payment of damages caused to the owners of lands or private property of any kind by reason of the operations of the United States, its officers or employees, in the survey, construction, operation, or maintenance of irrigation works, and which may be compromised by agreement between the claimant and the Secretary of the Interior, namely:

Salt River project, Arizona: For maintenance, operation, continuation of construction, and incidental operations, $458,000;

Yuma project, Arizona-California: For maintenance, operation, continuation of construction, and incidental operations, $500,000;

Orland project, California: For maintenance, operation, continuation of construction, and incidental operations, $43,000;

Grand Valley project, Colorado: For maintenance, operation, continuation of construction, and incidental operations, $192,000;

Uncompahgre project, Colorado: For maintenance, operation, continuation of construction, and incidental operations, $398,000;

Boise project, Idaho: For maintenance, operation, continuation of construction, and incidental operations, $396,000;

King Hill project, Idaho: For beginning construction, maintenance, operation, and incidental operations, $200,000: *Provided*, That no part of this appropriation shall be expended until the Secretary of the Interior shall have determined that the said King Hill project is practicable, as provided by section four of the act approved June seventeenth, nineteen hundred and two, known as the reclamation act, and shall have adopted the said project under and subject to the provisions and conditions of the said reclamation act;

Minidoka project, Idaho: For maintenance, operation, continuation of construction, and incidental operations, $222,000;

Garden City project, Kansas: For maintenance, operation, and incidental operations, $1,000: *Provided*, That the Secretary of the Interior is authorized to sell the machinery and equipment at the Garden City, Kansas, project at not less than its appraised value and cover the proceeds of such sale into the reclamation fund;

Huntley project, Montana: For maintenance, operation, continuation of construction, and incidental operations, $171,000;

Milk River project, Montana: For maintenance, operation, continuation of construction, and incidental operations, $330,000;

Sun River project, Montana: For maintenance, operation, continuation of construction, and incidental operations, $128,000;

Lower Yellowstone project, Montana-North Dakota: For maintenance, operation, continuation of construction, and incidental operations, $38,000;

North Platte project, Nebraska-Wyoming: For maintenance, operation, continuation of construction, and incidental operations, $1,170,000, together with the unexpended balance of the sum appropriated for this project for the fiscal year nineteen hundred and seventeen;

Truckee-Carson project, Nevada: For maintenance, operation, continuation of construction, and incidental operations, $795,000, together with the unexpended balance of the sum appropriated for this project for the fiscal year nineteen hundred and seventeen;

Carlsbad project, New Mexico: For maintenance, operation, continuation of construction, and incidental operations, $64,000;

Rio Grande project, New Mexico-Texas: For maintenance, operation, continuation of construction, and incidental operations, $648,000, together with the unexpended balance of the sum appropriated for this project for the fiscal year nineteen hundred and seventeen: *Provided*, That no part of this appropriation shall be expended for drainage except in irrigation districts formed under State laws and upon the execution of agreements for the repayment to the United States of all project investments;

North Dakota pumping project, North Dakota: For maintenance, operation, continuation of construction, and incidental operations, $54,000;

Lawton project, Oklahoma: For maintenance, operation, continuation of construction, and incidental operations, $101,000, together with the unexpended balance of the sum appropriated for this project for the fiscal year nineteen hundred and seventeen;

Umatilla project, Oregon: For maintenance, operation, continuation of construction, and incidental operations, $157,000;

Klamath project, Oregon-California: For maintenance, operation, continuation of construction, and incidental operations, $239,000;

Belle Fourche project, South Dakota: For maintenance, operation, continuation of construction, and incidental operations, $274,000;

Strawberry Valley project, Utah: For maintenance, operation, continuation of construction, and incidental operations, $170,000;

Okanogan project, Washington: For maintenance, operation, continuation of construction, and incidental operations, $32,000;

Yakima project, Washington: For maintenance, operation, continuation of construction, and incidental operations, $1,144,000;

Shoshone project, Wyoming: For maintenance, operation, continuation of construction, and incidental operations, $252,000, together with the unexpended balance of the sum appropriated for this project for the fiscal year nineteen hundred and seventeen;

For cooperative and other miscellaneous investigations (secondary projects), $50,000;

Under the provisions of this act no greater sum shall be expended, nor shall the United States be obligated to expend, during the fiscal year nineteen hundred and eighteen, on any reclamation project appropriated for herein an amount in excess of the sum herein appropriated therefor, nor shall the whole expenditures or obligations incurred for all of such projects for the fiscal year nineteen hundred and eighteen exceed the whole amount in the "reclamation fund" for that fiscal year;

Ten per centum of the foregoing amounts shall be available interchangeably for expenditure on the reclamation projects named; but not more than ten per centum shall be added to the amount appropriated for any one of said projects;

The act of June twenty-fifth, nineteen hundred and ten (Thirty-sixth Statutes, page eight hundred and thirty-five), is amended to provide that reimbursement of the moneys advanced under the provisions of that act shall be made by transferring annually the sum of $1,000,000 from the reclamation fund to the general funds in the Treasury, beginning July first, nineteen hundred and twenty, and continuing until full reimbursement has been made:

All moneys heretofore or hereafter refunded or received in connection with operations under the reclamation law, except repayments of construction and operation and maintenance charges, shall be a credit to the appropriation for the project or operation from or on account of which the collection is made and shall be available for expenditure in like manner as if said sum had been specifically appropriated for said project or operation;

In all, for the Reclamation Service, $8,227,000.

For reimbursement to the reclamation fund the proportionate expense of operation and maintenance of the reservoirs for furnishing stored water to the lands in Yakima Indian Reservation, Washington, in accordance with the provisions of section twenty-two of the act of August first, nineteen hundred and fourteen (Thirty-eighth Statutes, page six hundred and four), there is appropriated out of any money in the Treasury not otherwise appropriated, for the fiscal years that follow:

Nineteen hundred and fifteen to nineteen hundred and seventeen, inclusive, $13,100;
Nineteen hundred and eighteen, $8,110;
In all, $21,210.

RIGHT OF WAY NEAR ENGLE, N. MEX.

[Public—No. 145.]

An act to authorize the Secretary of the Interior to acquire certain right of way near Engle, New Mexico.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Interior be, and is hereby, authorized to receive on behalf of the United States from the Atchison, Topeka and Santa Fe Railway Company the conveyance of so much of said company's pipeline right of way from a point near Engle, New Mexico, to the Rio Grande River as will be flooded by the Elephant Butte Dam; and as the consideration for such conveyance the railway company shall be permitted to take from the water impounded above Elephant Butte Dam now under construction by the Reclamation Service, and which will flood such right of way, such quantity of water as the Secretary of the Interior may find to be necessary for the operation of said company's railway, but not exceeding thirty million gallons of water per month: *Provided,* That the Secretary of the Interior shall at all times have authority to determine the times, place, and manner in which said Atchison, Topeka and Santa Fe Railway Company shall be permitted to take such water from said reservoir, and that all expense incident thereto shall be borne by said railway company: *Provided further,* That neither the United States nor its successors in interest shall be held liable for or obligated to supply the water hereinbefore described, but in the event that the United States or its successors in interest shall abandon the use of the land upon which the said the Atchison, Topeka and Santa Fe Railway has its said right of way for a reservoir site as herein contemplated, said right of way, so far as the same may be conveyed to the United States hereunder, shall revert to the said railway company.

Approved, July 8, 1916.

ACCEPTANCE OF EXTENSION ACT.

[Public—No. 167.]

An act to amend section 14 of the reclamation extension act approved August 13, 1914.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section fourteen of an act entitled "An act extending the period of payment under reclamation projects, and for other purposes," approved August thirteenth, nineteen hundred and fourteen, be amended so as to read as follows:

"SEC. 14. That any person whose land or entry has heretofore become subject to the reclamation law, who desires to secure the benefits of the extension of the period of payments provided by this act, shall, within six months after the issuance of the first public

notice hereunder affecting his land or entry, notify the Secretary of the Interior, in the manner to be prescribed by said Secretary, of his acceptance of all the terms and conditions of this act, and thereafter his lands or entry shall be subject to all of the provisions of this act: *Provided*, That upon sufficient showing the Secretary of the Interior may, in his discretion, permit notice of acceptance of all the terms and conditions of this act to be filed at any time after the time limit hereinbefore fixed for filing such acceptance shall have expired, conditioned, however, that where the applicant for such acceptance is in arrears on construction charges he shall at the time of acceptance pay such installments of the construction charge as he would have been required to pay had he accepted this act within the time limit hereinabove fixed, plus the penalties that would have accrued had he so accepted, and such applicant shall thereafter be upon the same status that he would have been had he accepted the provisions of this act within the time limit hereinabove fixed, and thereafter the lands or entry of any such persons so filing such notice of acceptance shall be subject to all the provisions of this act."

Approved, July 26, 1916.

SALE OF BOISE & ARROWROCK RAILROAD.

[Public—No. 195.]

An act to authorize the Secretary of the Interior to cause to be appraised and to sell the Boise and Arrowrock Railroad, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That whenever in the opinion of the Secretary of the Interior the Boise and Arrowrock Railroad, constructed by the Reclamation Service under the provisions of the Act of Congress of June seventeenth, nineteen hundred and two (Thirty-second Statutes, page three hundred and eighty-eight), for use in connection with the construction of the Arrowrock Dam, Boise project, is no longer needed for said construction purpose, the said Secretary of the Interior may cause said railroad, together with the right of way on which the same is located, and such part of the equipment and appurtenances used in connection therewith as he shall deem most profitable or economical to sell in connection with said railroad, to be appraised by three disinterested persons, to be appointed by him, and thereafter to sell the same for not less than the appraised value, at public auction, to the highest bidder, after giving public notice of the time and place of sale by posting upon the premises and by publication once a week for not less than four weeks in a newspaper of general circulation in the city of Boise, Idaho, and in three other publications such as may, in the judgment of the Secretary of the Interior, give adequate publicity to the proposals of the Government, the proceeds of such sale to be covered into the reclamation fund and credited to the Boise project, and such credit applied upon the features of said project against which the cost of the construction of said railroad was charged: *Provided*, That said Secretary may reject any or all bids: *Provided further*, That after said railroad has once been offered for sale at public auction and not sold the Secretary may, in his discretion, sell said railroad, together with the equipment and appurtenances aforesaid, at private sale on such terms

and conditions, and at such price as he may deem to be to the best interest of the Government. Any sale hereunder shall be subject to the terms and conditions of two certain agreements, one dated March second, nineteen hundred and eleven, between the United States and the Barber Lumber Company, and the other dated November eighteenth, nineteen hundred and fifteen, between the Oregon Short Line Railroad Company and the United States.

Approved, August 11, 1916.

PUBLIC LANDS IN IRRIGATION DISTRICTS.

[Public—No. 196.]

An act to promote the reclamation of arid lands.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That when in any State of the United States under the irrigation district laws of said State there has heretofore been organized and created or shall hereafter be organized and created any irrigation district for the purpose of irrigating the lands situated within said irrigation district, and in which irrigation district so created or to be created there shall be included any of the public lands of the United States, such public lands so situated in said irrigation district, when subject to entry, and entered lands within said irrigation district, for which no final certificates have been issued, which may be designated by the Secretary of the Interior in the approval by him of the map and plat of an irrigation district as provided in section three, are hereby made and declared to be subject to all the provisions of the laws of the State in which such lands shall be situated relating to the organization, government, and regulation of irrigation districts for the reclamation and irrigation of arid lands for agricultural purposes, to the same extent and in the same manner in which the lands of a like character held under private ownership are or may be subject to said laws: *Provided*, That the United States and all persons legally holding unpatented lands under entry made under the public land laws of the United States are accorded all the rights, privileges, benefits, and exemptions given by said State laws to persons holding lands of a like character under private ownership, except as hereinafter otherwise provided: *Provided further*, That this act shall not apply to any irrigation district comprising a majority acreage of unentered land.

SEC. 2. That the cost of constructing, acquiring, purchasing, or maintaining the canals, ditches, reservoirs, reservoir sites, water, water right, rights of way, or other property incurred in connection with any irrigation project under said irrigation district laws shall be equitably apportioned among lands held under private ownership, lands legally covered by unpatented entries, and unentered public lands included in said irrigation district. Officially certified lists of the amounts of charges assessed against the smallest legal subdivision of said lands shall be furnished to the register and receiver of the land district within which the lands affected are located as soon as such charges are assessed; but nothing in this act shall be construed as creating any obligation against the United States to pay any of said charges, assessments, or debts incurred.

That all charges legally assessed shall be a lien upon unentered lands and upon lands covered by unpatented entries included in said

irrigation district; and said lien upon said land covered by unpatented entries may be enforced upon said unpatented lands by the sale thereof in the same manner and under the same proceeding whereby said assessments are enforced against lands held under private ownership: *Provided*, That in the case of entered unpatented lands the title or interest which such irrigation district may convey by tax sale, tax deed, or as a result of any tax proceeding shall be subject to the following conditions and limitations: If such unpatented land be withdrawn under the act of Congress of June seventeenth, nineteen hundred and two (Thirty-second Statutes, page three hundred and eighty-eight), known as the reclamation act, or subject to the provisions of said act, then the interest which the district may convey by such tax proceedings or tax deed shall be subject to a prior lien reserved to the United States for all the unpaid charges authorized by the said act of June seventeenth, nineteen hundred and two, but the holder of such tax deed or tax title resulting from such district tax shall be entitled to all the rights and privileges in the land included in such tax title or tax deed of an assignee under the provisions of the act of Congress of June twenty-third, nineteen hundred and ten (Thirty-sixth Statutes, page five hundred and ninety-two), and upon submission to the United States land office of the district in which the land is located of satisfactory proof of such tax title, the name of the holder thereof shall be indorsed upon the records of such land office as entitled to the rights of one holding a complete and valid assignment under the said act of June twenty-third, nineteen hundred and ten, and such person may at any time thereafter receive patent upon submitting satisfactory proof of the reclamation and irrigation required by the said act of Congress of June seventeenth, nineteen hundred and two, and acts amendatory thereto, and making the payments required by said acts.

SEC. 3. That no unentered lands and no entered lands for which no final certificates have been issued shall be subject to the lien or liens herein contemplated until there shall have been submitted by said irrigation district to the Secretary of the Interior, and approved by him, a map or plat of said district and sufficient detailed engineering data to demonstrate to the satisfaction of the Secretary of the Interior the sufficiency of the water supply and the feasibility of the project, and which shall explain the plan or mode of irrigation in those irrigation districts where the irrigation works have not been constructed, and which plan shall be sufficient to thoroughly irrigate and reclaim said land and prepare it to raise ordinary agricultural crops, and which shall also show the source of water to be used for irrigation of land included in said district: *Provided*, That the Secretary of the Interior may, upon the expiration of ten years from the date of his approval of said map and plan of any irrigation district, release from the lien authorized by this act any unentered land or lands upon which final certificate has not issued, for which irrigation works have not been constructed and water of such district made available for the land: *Provided further*, That in those irrigation districts already organized and whose irrigation works have been constructed and are in operation as soon as a satisfactory map, plat, and plan shall have been approved by the Secretary of the Interior, as in this act provided, such entered and unentered lands shall be subject to all district taxes and assessments theretofore actually levied against the

lands in said district and in the same manner in which lands of a like character held under private ownership are subject to liens and assessments.

SEC. 4. That upon the approval of the district map or plat as hereinbefore provided by the Secretary of the Interior the register and receiver will note said approval upon their records where any unentered or entered and unpatented lands are affected.

SEC. 5. That no public lands which were unentered at the time any tax or assessment was levied against same by such irrigation district shall be sold for such taxes or assessments, but such tax or assessment shall be and continue a lien upon such lands, and not more than one hundred and sixty acres of such land shall be entered by any one person; and when such lands shall be applied for, after said approval by the Secretary of the Interior, under the homestead or desert-land laws of the United States the application shall be suspended for a period of thirty days to enable the applicant to present a certificate from the proper district or county officer showing that no unpaid district charges are due and delinquent against said land.

SEC. 6. That any entered but unpatented lands not subject to the reclamation act of June seventeenth, nineteen hundred and two (Thirty-second Statutes, page three hundred and eighty-eight), sold in the manner and for the purposes mentioned in this act may be patented to the purchaser thereof or his assignee at any time after the expiration of the period of redemption allowed by law under which it may have been sold (no redemption having been made) upon the payment to the receiver of the local land office of the minimum price of $1.25 per acre, or such other price as may be fixed by law for such lands, together with the usual fees and commissions charged in entries of like lands under the homestead laws, and upon a satisfactory showing that the irrigation works have been constructed and that water of the district is available for such land; but the purchaser or his assignee shall, at the time of application for patent, have the qualification of a homestead entryman or desert-land entryman, and not more than one hundred and sixty acres of said land shall be patented to any one purchaser under the provisions of this act.

These limitations shall not apply to sales to irrigation districts, but shall apply to purchasers from such irrigation districts of such land bid in by said district.

That unless the purchaser or his assignee of such lands shall, within ninety days after the time for redemption has expired, pay to the proper receiver all fees and commissions and the purchase price to which the United States shall be entitled as provided for in this act, any person having the qualification of a homestead entryman or a desert-land entryman may pay to the proper receiver, for not more than one hundred and sixty acres of said lands, for which payment has not been made, the unpaid purchase price, fees, and commissions to which the United States may be entitled; and upon satisfactory proof that he has paid to the purchaser at the tax sale, or his assignee, or to the proper officer of the district for such purchaser or for the district, as the case may be, the sum for which the land was sold at sale for irrigation district charges or bid in by the district at such sale, and in addition thereto the interest and penalties on the amount

bid at the rate allowed by law, shall be subrogated to the rights of such purchaser to receive patent for said land.

In any case where any tract of entered land lying within such approved irrigation district shall become vacant by relinquishment or cancellation for any cause, any subsequent applicant therefor shall be required, in addition to the qualifications and requirements otherwise provided, to furnish satisfactory proof by certificate from the proper district or county officer that he has paid all charges then due to the district upon said land and also has paid to the proper district or county officer for the holder or holders of any tax certificates, delinquency certificates, or other proper evidence of purchase at tax sale the amount for which the said land was sold at tax sale, together with the interest and penalties thereon provided by law.

SEC. 7. That all notices required by the irrigation district laws mentioned in this act shall, as soon as such notices are issued, be delivered to the register and receiver of the proper land office in cases where unpatented lands are affected thereby, and to the entryman whose unpatented lands are included therein, and the United States and such entryman shall be given the same rights to be heard by petition, answer, remonstrance, appeal, or otherwise as are given to persons holding lands in private ownership, and all entrymen shall be given the same rights of redemption as are given to the owners of lands held in private ownership.

SEC. 8. That all moneys derived by the United States from the sale of public lands herein referred to shall be paid into such funds and applied as provided by law for the disposal of the proceeds from the sale of public lands.

Approved, August 11, 1916.

RELIEF OF SETTLERS UNDER YUMA PROJECT.

[Public—No. 212.]

An act for the relief of certain settlers under reclamation projects.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That any person who has heretofore established residence upon and improved any tract of land within the irrigable area of the Yuma reclamation project in Arizona withdrawn from entry under the provisions of the reclamation law and acts supplementary thereto and amendatory thereof, and who shall have made valuable improvements upon such lands, and who has resided thereon in good faith for two years prior to the passage of this act, may make entry for the farm unit upon which his residence is established, and that such residence and improvements heretofore made shall be credited upon his final proof.

Approved, August 17, 1916.

SALE OF TOWN-SITE LANDS AT NEWELL, S. DAK.

[Public—No. 285.]

An act authorizing the Secretary of the Interior to sell the unsold and unappropriated portions of lands within the town site of Newell, South Dakota, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Interior be, and he is hereby, authorized and directed to reserve and

set apart such portions of the unsold and unappropriated lands within the town site of Newell, Butte County, South Dakota, as he deems necessary for administrative purposes in connection with the Belle Fourche irrigation project, and after subdividing the remaining portions of such lands into tracts that in his judgment would render the same most salable, and, appraising the reasonable value of each such tracts, sell the same, for not less than the appraised value, at public auction to the highest bidder, on such terms and under such rules and regulations as he may establish.

SEC. 2. That of the proceeds of such sales, after deducting all expenses incurred in the subdivision, appraisement, and sale of said land, an amount not exceeding $15,000 shall be covered into the Treasury of the United States in a special fund available only for expenditure by the Secretary of the Interior to provide or assist in providing the said town of Newell, Butte County, South Dakota, an adequate system of water supply for domestic purposes, under such terms and conditions as may be provided by the Secretary of the Interior, or for such other and further public improvements as the Secretary of the Interior and the municipal authorities of said town may agree upon. The net proceeds of such sale in excess of $15,000, if any there be, shall be covered into the Treasury of the United States and credited to the reclamation fund in accordance with existing law for the sale of town sites on reclamation projects.

SEC. 3. That the Secretary of the Interior is hereby authorized to make such rules and regulations as may be necessary for carrying into effect the provisions of this act.

Approved, September 8, 1916.

AUXILIARY RECLAMATION PROJECT AT YUMA.

[Public—No. 293.]

An act to provide for an auxiliary reclamation project in connection with the Yuma project, Arizona.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Interior is hereby authorized to set apart any lands in the State of Arizona heretofore or hereafter withdrawn under the reclamation law, in connection with the Yuma reclamation project, as an auxiliary reclamation project or unit, and sell, in tracts of such size as he may determine of not more than one hundred and sixty acres to any one purchaser, the lands so set apart and believed to be susceptible of irrigation, at public sale under suitable regulations, for not less than the reasonable value per acre of the land plus the estimated cost per acre of reclamation works to be constructed for the reclamation of said lands so set apart plus the proportionate cost per acre of the works previously constructed and available therefor. That appurtenant water rights for lands in private ownership may be sold for not to exceed one hundred and sixty acres to any one person at a price equal to the estimated cost per acre of the works to be constructed plus the proportionate cost per acre of the works previously constructed and available for the lands, if any there be, payment to be made under the same terms as for public land under the provisions of section two. Final water-right certificate shall not be issued to

such private land until payment has been made in full. No works shall be constructed nor water delivered through any of the works of the Yuma project for the irrigation of any such private lands unless application has been made to purchase a water right for such land under the terms and provisions of this section. The Secretary of the Interior, at or prior to the time of sale, shall fix and determine (a) the reasonable value of the land per acre; (b) the estimated cost per acre of the work to be constructed; and (c) the proportionate cost per acre of the works previously constructed and available for the lands offered for sale.

SEC. 2. That all bidders at such public sale shall be required to make a deposit of ten per centum of the amount bid for the tract proposed to be purchased, and upon notice from the Secretary of the Interior that such bid has been accepted shall be required to pay fifteen per centum additional within sixty days after such notice. In case of failure to do so the deposit shall be forfeited and the corresponding lands shall be available for further sale. In case the bids for the lands shall not aggregate a sufficient amount within six months from the time fixed for the filing of bids to meet the probable cost as announced, all deposits shall be returned. The remaining seventy-five per centum of the purchase price shall be paid in three annual installments, with interest at six per centum per annum on deferred payments until paid, running from the date of notice to pay the additional fifteen per centum, but advance payments may be received at any time. Upon full payment of the purchase price patent shall issue for the lands, and no qualification or limitation shall be required of any purchaser or patentee except that he be a citizen of the United States. Such patent shall also contain a grant of a water right appurtenant to the land: *Provided*, That any person who has made an entry which is now valid and subsisting, or who has a preference right to make entry, for any irrigable land embraced within the limits of the auxiliary project, may purchase said land at the price of $2.50 per acre and shall be subject to the same payments for the irrigation works as is required of persons holding private lands under the provisions of section one hereof: *Provided further*, That the purchasers or owners of the land to be irrigated under said auxiliary reclamation project shall also agree to pay to the United States the total actual cost of the works of said auxiliary reclamation project in the event that the actual cost of said works shall exceed the estimated cost thereof.

SEC. 3. That the moneys received under the provisions of this Act shall be paid into the Treasury of the United States and be covered into a separate fund known as the auxiliary reclamation fund of the Yuma project, Arizona.

SEC. 4. That the money in the said auxiliary reclamation fund of the Yuma project, Arizona, shall be available for the construction or completion of irrigation works for the said auxiliary project or unit to the extent of the moneys received on account thereof in connection with the sale of the lands therein. The landowners shall pay the cost of operation and maintenance, and the charges to cover such cost as fixed by the Secretary of the Interior shall be paid each year in advance of the delivery of water. Upon the announcement by the Secretary of the Interior of the completion of the said auxiliary

project or unit thereof, the operation and maintenance of the irrigation works shall, as soon as practicable, be turned over to an organization representing a majority of the landowners, to be operated and maintained by them at their expense in accordance with a contract therefor to be made with the Secretary of the Interior.

SEC. 5. Any surplus of funds paid on account of construction remaining after completion thereof, and that any money remaining in said separate fund known as the auxiliary reclamation fund of the Yuma project, Arizona, after completion of the said auxiliary project and after reimbursement of the reclamation fund for the proportionate share of works built by means of the latter fund shall be credited to the cost of operation and maintenance of the works of the said auxiliary project, and any balance thereof on hand when the said auxiliary project is taken over, as provided in section four, shall be paid to the contracting organization.

SEC. 6. That the provisions of the reclamation act of June seventeenth, nineteen hundred and two, and acts amendatory thereof and supplementary thereto, known as the reclamation law, shall be applicable to such auxiliary project, except any portions of such acts as may be in conflict with the provisions hereof.

SEC. 7. That the Secretary of the Interior is hereby authorized to perform any and all acts and to make such rules and regulations as may be necessary and proper for the purpose of carrying the provisions of this act into full force and effect.

Approved, January 25, 1917.

PATENTS AND FINAL WATER-RIGHT CERTIFICATES.

[Public—No. 322.]

An act to amend section one of the Act of August ninth, nineteen hundred and twelve, providing for patents on reclamation entries, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the proviso to section one of the Act of August ninth, nineteen hundred and twelve (Thirty-seventh Statutes, page two hundred and sixty-five), entitled "An act providing for patents on reclamation entries, and for other purposes," be amended to read as follows:

"*Provided*, That no such patent or final water-right certificate shall issue until after the payment of all sums due the United States on account of such land or water right at the time of the submission of proof entitling the homestead or desert-land entryman to such patent or the purchaser to such final water-right certificate."

Approved, February 15, 1917.

SALE OF LANDS TO GREAT NORTHERN RAILWAY COMPANY.

[Public - No. 355.]

An act authorizing the Secretary of the Interior to sell and convey to the Great Northern Railway Company certain lands in the State of Montana for division terminal yards and other railway purposes, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Interior be, and he is hereby, authorized and directed to cause to be appraised all those parts of section thirty-two and thirty-three, town-

ship thirty-one north, range thirty-two east, and of section five, township thirty north, range thirty-two east, Montana meridian, State of Montana, described as follows:

Beginning at the point of intersection of the present right of way of the Great Northern Railway with the east line of the northwest quarter of the southeast quarter of said section thirty-three, which point is seventy-five feet northerly at right angles from the center line of said Great Northern Railway as the same is now constructed across said section thirty-three; thence westerly to a point on the west line of said quarter quarter section three hundred feet northerly at right angles from said center line; thence southwesterly parallel with said center line to an intersection with the east and west quarter quarter section line in the southwest quarter of said section thirty-three; thence westerly along said quarter quarter section line to the west line of said section thirty-three; thence westerly along the east and west quarter quarter section line in the south half of said section thirty-two to the northwest corner of the southwest quarter of the southwest quarter of said section thirty-two; thence southerly along the west line of said quarter quarter section to the north line of section five, township thirty north, range thirty-two east; thence westerly along said north line to the northwest corner of said section five; thence southerly along said west line to the present northerly right-of-way line of said railway, which right-of-way line is seventy-five feet northerly at right angles from the center line of said railway as the same is now constructed; thence northeasterly parallel with said center line to the place of beginning. Also beginning at the point of intersection of the southerly right-of-way line of said railway with the east line of the southwest quarter of the southeast quarter of said section thirty-two, said point being seventy-five feet distant southerly at right angles from said center line; thence southwesterly parallel with said center line to the west line of lot three, section five, township thirty north, range thirty-two east; thence southerly along said west line to a point two hundred feet distant southerly at right angles from said center line; thence northeasterly parallel with said center line to the east line of the southwest quarter of the southeast quarter of said section thirty-two; thence northerly along said east line to the place of beginning, the said tracts containing in the aggregate one hundred and seventy and seven one-hundredths acres, more or less. The said center line of railway is described as beginning one hundred and twenty-nine feet south of the east quarter corner of said section thirty-three, running thence southwesterly in a straight line, intersecting the west line of said section thirty-two nine hundred and twenty-one feet north of the southwest corner, a distance of ten thousand four hundred and twenty-two feet; thence on a curve to the left, with a radius of eleven thousand four hundred and fifty-nine and two-tenths feet, a distance of five hundred feet; thence southwesterly, tangent to said curve, five hundred and eleven and four-tenths feet to the west line of said section five at a point eight hundred and twenty-five and five-tenths feet south of the northwest corner.

SEC. 2. That the Secretary of the Interior be, and he is hereby, further authorized and directed to cause to be appraised all those parts of sections fourteen and fifteen, township twenty-seven north, range forty-

seven east, Montana meridian, in the Fort Peck Indian Reservation, State of Montana, described as follows:

Beginning at the point of intersection of the present right-of-way line of the Great Northern Railway with the east line of the northwest quarter of the northeast quarter of said section fourteen, which point is seventy-five feet distant northerly at right angles from the center line of said Great Northern Railway as the same is now constructed over said section; thence westerly in a straight line to a point on the west line of said quarter quarter section which is two hundred and seventy-five feet distant northerly at right angles from said center line; thence southwesterly parallel with said center line to an intersection with the south line of the northwest quarter of the northwest quarter of said section fourteen; thence westerly along said south line to the west line of said section fourteen; thence westerly along the east and west quarter quarter section line in the north half of said section fifteen, to the northwest corner of the southeast quarter of the northwest quarter of said section fifteen; thence south along the west line of said quarter quarter section one thousand one hundred and seventy feet; thence southwesterly eight hundred and fifty feet to a point on the present northerly right-of-way line of the said Great Northern Railway, which point is one hundred feet distant northerly at right angles from the center line of said railway as the same is now constructed; thence northeasterly parallel with said center line to the north and south quarter section line of said section fifteen; thence southerly along said quarter line to a point seventy-five feet distant northerly at right angles from the said center line; thence northeasterly parallel with said center line to the place of beginning, containing ninety-four and fifteen one-hundredths acres, more or less. The said center line of railway is a tangent intersecting the east line of section fourteen, three hundred and sixty-five and seven-tenths feet south of the northeast corner thereof, the east line of section fifteen, nine hundred and five and eight-tenths feet north of the east quarter corner and the west line of section fifteen, four hundred and sixty-six and eight-tenths feet south of the west quarter corner.

SEC. 3. That upon appraising the said lands the Secretary of the Interior is authorized and directed to sell and convey the same to the Great Northern Railway Company, a corporation of the State of Minnesota, and owning and operating lines of railway in the State of Montana and other States, for division terminal yards and other railway purposes, upon such terms as he may deem advisable. If the sale of any of the lands described in section two hereof shall include the whole or any part of the allotment of an individual Indian, the purchase price of such allotted land shall be paid to such Indian, subject to the control of the Secretary of the Interior as to the funds of incompetent Indians.

SEC. 4. That the appraisal of the lands described in section one of this act shall take into consideration the estimated cost per acre for the construction of irrigation works for the Milk River irrigation project, and in no event shall be less than the actual market value of said land and the estimated cost per acre for the construction of said irrigation project. The conveyances for the lands described above in sections one and two shall reserve to the United States and its successors in interest right of way for canals or ditches heretofore or hereafter constructed thereon, and the railway company shall construct at its

own expense any crossings of said canals or ditches which may be necessary for its purposes, and such crossings shall be built and maintained in such a manner as not to interfere with the operations of said canals or ditches by the United States or its successors in interest, and such conveyances shall be subject to any prior valid rights of way.

Approved February 26, 1917.

LAW DECISIONS.

ENTRIES

Conforming entries and disposing of excess lands.—Farm-unit plats are a part of the public notice affecting same, and where such plats are approved by the Secretary of the Interior prior to date of the public notice the latter date controls, and entrymen who submitted proof on or prior thereto will have two years from the date of notice within which to conform their entries and dispose of excess lands under section 13 of the extension act. Where proof is submitted after date of public notice the two years begin to run from the date of such proof, provided that same is submitted within four years from the date fixed by the Secretary when water will be available for irrigation of the lands in question. (General Land Office decision, Mar. 28, 1917—Salt River.)

Application of act of February 18, 1911.—This act applies only to entries of record next previous to the passage of the act of June 25, 1910 (36 Stat., 835), and can not be invoked upon the basis of a relinquished entry preceding the entry of record at the date of the passage of the act. (Fred Anderson, 45 L. D., 504.)

CHARGES.

Operation and maintenance charges.—These charges follow the same rule as construction charges and do not accumulate against lands for which water-right application has not been made. The effect is that all operation and maintenance charges since December 1, 1914, under the extension act are to be considered as not accumulating. (Reclamation circular letter, No. 622, Dec. 16, 1916.)

Five per cent increase in construction charges.—In the case of lands for which water-right application is made under section 2 of the extension act, the 5 per cent increase in construction charges provided for by section 9 of the act ceases when the water-right application is made; but in cases where water-right application is made for lands under section 1 said increase does not cease until both the application is made and the initial installment is paid. (Reclamation Commission decision, Mar. 17, 1917, circular letter No. 640.)

LEASES.

General rule as to leases of first-form lands.—Whenever it is reasonably necessary for the preservation of the buildings, works, and other property, or for the proper protection and efficiency of any reclamation project, or where special conditions make it advisable, first-form withdrawn or purchased lands may be leased to the highest bidder for a term to be decided upon by the Reclamation Commission as the conditions may arise. (Reclamation Commission decision, Mar. 23, 1917.)

Lease of first-form lands in national forests.—While the Secretary of the Interior may determine what lands within national forests withdrawn for reclamation purposes are necessary for the proper protection of reservoirs constructed under the reclamation act, he has no power to lease such lands, since authority in that regard is specifically granted to the Secretary of Agriculture; but in recognition of the needs of the Reclamation Service and to forestall any contracts detrimental to a reclamation project, all leases should be subject to the prior approval of the Secretary of the Interior. (Opinion Acting Attorney General John W. Davis, Nov. 28, 1916.)

RECLAMATION FUND.

Application of power receipts.—Returns from the sale of power and power privileges are to be credited as a refund on account of the construction cost of the project. (Departmental decision, Dec. 28, 1916.)

Court costs payable from reclamation fund.—Costs in an action against an employee of the Reclamation Service, regarding his official acts, which action is defended for said employee by the United States, are payable out of the reclamation fund. (Comp. Dec., in re Marley *v.* Cone (Salt River), Dec. 6, 1916.)

Payment of exchange on checks for water charges.—Reimbursement can not be made from the reclamation fund to a bank to cover exchange on a check given in payment of water charges. (In re C. W. Kellogg, Comp Dec., Mar. 9, 1917.)

Receipts from sale of town lots.—It is not permissible to deduct the receipts from the sale of town lots from construction or operation and maintenance cost. Neither is it permissible to class such receipts as repayments under the Comptroller's decision of December 6, 1906. They are accretions to the reclamation fund directly resulting from the operations of the Reclamation Service. (Reclamation circular letter No. 639, Mar. 22, 1917.)

Reclamation telephones in private residences.—Under section 7 of the act of August 23, 1912 (37 Stat., 414), payment can not be made from the reclamation fund for a telephone installed in any private residence, regardless of whether or not the telephone is for official use, and this prohibition covers service as well as rental. (Comp. Dec., May 8, 1917.)

RESERVOIR SITES.

Double use of reservoir sites.—It is the policy of the land department to secure the utilization of reservoir sites to the largest extent possible, and where that purpose can be best attained by joint or double use of reservoir sites such use will be permitted. (Dixon *v.* Dry Gulch Irrigation Co., 45 L. D., 4.)

WATER RIGHTS.

Water-rights for corporations.—Religious, educational, charitable and eleemosynary corporations are excepted from the decision of July 11, 1913, forbidding acceptance of water-right application from a corporation. (Departmental decision, Dec. 5, 1916.)

If an individual owns land for which he makes water-right application duly accepted by the United States and the land is later in good

faith transferred to a corporation, the corporate owner is entitled thereafter to the same treatment as other landowners on a project. (Departmental decision, in re The Santaquin Lime & Quarry Co. (Truckee-Carson), Dec. 6, 1916.)

Reinstatement of water-right application on payment of accrued charges.—Where a water-right application for land held in private ownership has been canceled for default in payment of building, operation, and maintenance charges, such application may be reinstated upon full payment of all accrued charges. (Departmental decision, 45 L. D., 23.)

LITIGATION.

[Cases initiated in the fiscal year ending June 30, 1917, marked thus: *.]

ARIZONA, SALT RIVER PROJECT.

Arizona Alfalfa Milling Company v. *United States.*—Suit brought June 2, 1913, in Court of Claims for $46,527.36. Plaintiff's petition dismissed January 8, 1917.

State v. *A. J. Haltom.*—Warrant for criminal trespass, issued May 10, 1915, from court of justice of the peace at Phoenix. Case pending on appeal taken to superior court for Maricopa County.

W. B. Lount and Hattie L. Mosher v. *A. J. Haltom.*—Suit brought May 25, 1915, in superior court for Maricopa County for $1,718.96 damages. Tried April 12, 13, 14, 1916, and verdict rendered for defendant. Plaintiff's motion for new trial denied. Case pending on motion in connection with costs.

United States v. *Alice M. Mitchell et al.*—Suit brought October 27, 1915, in the United States district court for condemnation of land for canal right of way. Settled October 31, 1916, for $100.

* *W. B. Lount and Hattie L. Mosher* v. *Wm. S. Cone, Walter Ward, and Arthur J. Haltom.*—Suit brought in United States District Court August 9, 1916, to enjoin alleged overflowing of plaintiff's lands by Salt River Valley Canal, etc., and to recover $10,000 damages. Case pending on defendants' motion to dismiss.

* *May B. Marley* v. *Wm. S. Cone and Arthur J. Haltom.*—Suit brought October 31, 1916, in United States district court for injunction restraining wasting water from Cave Creek or other sources into Skunk Creek or New River Channels, and to recover $4,500 damages. Case pending on defendants' motion to dismiss.

* *United States* v. *Marion E. Braddock.*—Proceedings brought April 8, 1917, in United States district court to condemn land. Amount involved estimated at $7,500. Case pending.

* *United States* v. *The Packard Investment Company.*—Action brought March 27, 1917, in United States district court for $170.31. Case pending.

ARIZONA-CALIFORNIA, YUMA PROJECT.

* *Yuma Valley Water Users' Association et al.* v. *Schlecht and Fessenden.*—Suit filed June 30, 1917, in United States district court for injunction to restrain Reclamation Service from enforcing construction charge of $75 per irrigible acre in Yuma Valley. Case pending.

CALIFORNIA, ORLAND PROJECT.

No litigation.

COLORADO, GRAND VALLEY PROJECT.

In re adjudication water rights, Grand River, District No. 42.—Petition filed November 2, 1908, in State district court. October 4, 1915, Colorado supreme court quashed writ of error without prejudice to United States, on ground that judgment was not final. Orchard Mesa irrigation district intervened to have its rights determined. Decree entered November 5, 1915. On November 6, 1915, motion of United States for new trial denied, written exceptions filed, and leave granted for extension of the record.

COLORADO, UNCOMPAHGRE VALLEY PROJECT.

United States to the use of the Montrose Hardware Company et al. v. *C. D. McPhee et al.*—Suit brought September 11, 1905, in State district court. Appeal argued in supreme court of Colorado January 17, 1916; decision not yet rendered.

United States v. *Alymer F. Reeves.*—Condemnation proceedings brought March 17, 1911, in United States district court for canal right of way. Settled by deed and case closed.

United States v. *Martin Van Horn et al.*—Suit brought April 25, 1912, in United States district court for an injunction. Case pending.

* *United States* v. *G. W. Summer.*—Suit brought August 11, 1916, in United States district court to enjoin the defendant from interfering with the use by the United States of a right of way under the provisions of the act of August 30, 1890. Final decree for plaintiff was entered November 22, 1916.

* *United States* v. *Miller Fairlamb et al.*—Suit filed November 27, 1916, in United States district court to condemn land for right of way. Case pending.

IDAHO, BOISE PROJECT.

Farmers' Cooperative Ditch Company v. *Riverside Irrigation District et al.*—Suit brought in August, 1902, in State district court to adjudicate water rights. On July 19, 1916, an order was secured providing for distribution of water during the season of 1916 on the following basis: From July 19, 1916, to July 31, 1916, 100 per cent of the Stewart decree entered January 6, 1906; from August 1, 1916, to August 10, 1916, 75 per cent of the Stewart decree; during the remainder of season 0.6 of the Stewart decree.

United States v. *Highland Valley Power Co.*—Suit brought February 2, 1911, in Federal court to quiet title. July 31, 1916, United States took title through purchase at receiver's sale and case has been dismissed.

Page and Brinton v. *United States.*—Petition filed February 27, 1912, in court of claims for $325,000 damages. Additional testimony taken at Boise, Idaho, and Washington, D. C. Testimony completed. Case pending.

United States v. *Marsters and Lakin.*—Suit brought July 13, 1913, in United States district court for injunction and damages. Need for injunction having disappeared, case was tried for damages and

judgment in sum of $1,000 for plaintiff given. On appeal by defendants to circuit court of appeals judgment was affirmed. (See Marsters *v.* United States, 236 Fed., 663.)

Pioneer Irrigation District v. *American Ditch Company et al.*—Suit brought July 14, 1913, in State district court for adjudication of water rights. Tried, argued, and submitted November 24, 1915, but not yet decided.

United States v. *American Ditch Co. et al.*—Suit brought October 3, 1913, in United States district court to adjudicate water rights, Boise River. Case pending.

United States v. *State of Idaho* (*Canyon County*).—Complaint filed August 26, 1914, for condemnation of land. April 12, 1917, final order of condemnation was entered transferring title to the United States.

United States v. *State of Idaho* (*Ada County*).—Complaint filed August 26, 1914, for condemnation of land. April 12, 1917, final order of condemnation was entered transferring title to the United States.

United States v. *Samuel W. Shook et al.*—Proceedings brought March 28, 1916, to condemn land needed as right of way for the 10-mile drainage canal. February 17, 1917, settled out of court by contract. Case dismissed.

* *United States* v. *Swan Ringwood.*—Suit filed November 8, 1916, in United States district court to condemn land needed as right of way. United States given possession of property; case pending.

**H. A. Griffiths et al.* v. *Pioneer Irrigation District, Riverside Irrigation District, Farmers' Cooperative Ditch Co., A. P. Davis, F. E. Weymouth, D. W. Cole, D. C. Henny, A. J. Wiley, B. E. Stoutemyer, and Will R. King.*—Suit brought December 31, 1916, in State district court to quiet title to water appropriations alleged to have been made by plaintiff from Mason Creek and Wilson Slough. June 13, 1917, demurrer by defendants sustained. June 21, 1917, amended complaint filed. Case pending.

IDAHO, MINIDOKA PROJECT.

Brinck as receiver v. *United States.*—Suit brought in Court of Claims for $122,148. October 6, 1916, amended petition filed reducing plaintiff's claim to $60,061.10. Testimony completed. Case pending.

KANSAS, GARDEN CITY PROJECT.

No litigation.

MONTANA, BLACKFEET (INDIAN) PROJECT.

George W. Cook and David D. LaBreche v. *United States.*—Suit brought in 1911 in the United States district court for $25,000 damages and for an injunction. May 5, 1916, a bill was introduced in the Senate (S. 5912) by Senator Walsh, of Montana, providing for an appropriation of $22,400 from the reclamation fund to be paid plaintiffs for the conveyance of all their lands, property, and rights in connection with their allotments at the foot of Lower Two Medicine Lake. Bill referred to Committee on Indian Affairs.

MONTANA, FLATHEAD (INDIAN) PROJECT.

United States v. *Missoula County, Montana.*—Suit filed January 13, 1916, to enjoin defendant county and its officers from selling for taxes reclamation homestead lands on Flathead project. Temporary restraining order issued. October 8, 1916, decision handed down by Judge Bourquin holding, in effect, that the lands embraced within reclamation homestead entries were not subject to taxation until everything has been done by the entrymen which should be done to entitle them to patents; also holding that after final homestead proofs have been made the equity in the land may be taxed; that the United States can not maintain a suit on behalf of any private person or interest, nor to protect the entryman's equity in the lands, save where some statute authorizes it. The decree granted any entryman the right to intervene within 20 days.

United States v. *Flathead County, Montana.*—Suit filed January 13, 1916, to enjoin defendant county and its officers from selling for taxes reclamation homestead lands on Flathead project. Same decision as in preceding case.

United States v. *Sanders County, Montana.*—Suit filed January 13, 1916, to enjoin defendant county and its officers from selling for taxes reclamation homestead lands on Flathead project. Same decision as in preceding case.

MONTANA, FORT PECK (INDIAN) PROJECT.

No litigation.

MONTANA, HUNTLEY PROJECT.

No litigation.

MONTANA, MILK RIVER PROJECT.

Measurement and apportionment of waters of Milk and St. Mary Rivers.—Controversy between the United States and Canada arising under the treaty of January 11, 1909, between the United States and Great Britain. The Reclamation Service is concerned because its operations include use of the waters of the two rivers involved. Argued for the Service by the chief counsel May 15, 1917, before the International Joint Commission at Detroit, Mich.

**United States* v. *William M. Wooldridge.*—Suit in foreclosure brought October 18, 1916. United States intervened to protect easement in connection with Vandalia Reservoir. Stipulation secured from mortgagee protecting flowage rights desired by the United States.

MONTANA, MILK RIVER PROJECT, ST. MARY STORAGE.

George Henkel et al. v. *United States.*—Suit brought in 1913 in United States district court to compel allotment of lands. Case dismissed.

MONTANA, SUN RIVER PROJECT.

**United States* v. *William B. Orser.*—Suit to collect $1,190.80, unpaid water charges. Have thus far been unable to secure service on defendant.

MONTANA-NORTH DAKOTA, LOWER YELLOWSTONE PROJECT.

Pacific Coast Construction Co. v. *United States.*—Suit brought May 31, 1911, in Court of Claims to recover $34,852.50. Case pending.

Widell-Finley Company et al. v. *United States.*—(See South Dakota, Belle Fourche project.)

United States v. *Charles W. Dick.*—Suit brought May 12, 1916, in the United States district court to recover $1,496 delinquent water-right charges. Case pending.

NEBRASKA-WYOMING, NORTH PLATTE PROJECT.

S. R. H. Robinson & Son Contracting Co. v. *United States.*—Suit filed November 7, 1913, in Court of Claims for $100,531.86. Case pending.

NEVADA, TRUCKEE-CARSON PROJECT.

Western Company v. *Stone & Webster Construction Co., Truckee General Electric Co., et al.*—Suit brought September 24, 1912, in United States district court, to enjoin changing level of Lake Tahoe. In July, 1915, plaintiff filed amended and supplemental complaint, omitting as defendants the Stone & Webster Construction Co. and Truckee River General Electric Co., and adding as defendants A. P. Davis, Director and Chief Engineer, United States Reclamation Service; D. W. Cole, project manager, Truckee-Carson project; and John F. Truesdell, special assistant to Attorney General of the United States. Case pending.

United States v. *Orr Water and Ditch Co.*—Suit filed March 3, 1913, for adjudication of water rights along Truckee River and tributaries. Case pending.

John Horstman Company v. *United States.*—Suit filed in Court of Claims for $35,000 damages. Case pending.

Natron Soda Co. v. *United States.*—Suit filed in Court of Claims for $170,000 damages. Case pending.

**State of California* v. *Truckee River General Electric Co., Western Company, et al.*—Suit to determine ownership of State in lands below high-water mark, Lake Tahoe, and for removal of outlet dam. Brought in State court, Placer County, Cal., and removed to United States district court. Case pending.

NEW MEXICO, CARLSBAD PROJECT.

United States v. *Charles A. Bigelow et al.*—Procee ngs initiated January 15, 1915, in United States district court for condemnation of land. Referee's report filed July 2, 1916. Commissioner's report filed February 3, 1917. Case pending on exceptions by plaintiff and certain defendants to report of commissioner.

**United States* v. *A., T. & S. F. Ry. Co.*—Suit filed September 11, 1916, in United States district court for condemnation. Order giving plaintiff possession and appointing appraisers issued September 15, 1916. Case pending.

NEW MEXICO, HONDO PROJECT.

United States v. *El Paso & Rock Island Railway Co.*—Suit filed March 17, 1913, in United States district court to adjudicate water rights. Prosecution of case discontinued so far as interests of Reclamation Service are concerned. Case pending as to other rights.

NEW MEXICO-TEXAS, RIO GRANDE PROJECT.

El Paso Water Users' Association v. *W. H. Austin et al.*—Suit filed April 29, 1912, in the United States district court for the adjudication of water rights. Case pending.

Oscar C. Snow v. *Francisco Abalos et al.*—Suit filed against about 6,000 defendants October 24, 1912, in the State district court to adjudicate water rights. Case pending.

Nellie D. Sperry v. *Chamberino Community Ditch Co. et al.*—Suit filed March 31, 1916, in State district court against employees of the Reclamation Service and others seeking an injunction against the operation of a certain flume across the West Side Canal on account of alleged defective construction and operation which resulted in the flooding of plaintiff's land; also damages for $5,000. Injunction denied. Case pending on claim for damages.

NORTH DAKOTA, NORTH DAKOTA PUMPING PROJECT.

No litigation.

OREGON, UMATILLA PROJECT.

In re determination of water rights, Umatilla project.—Proceedings begun September 11, 1911, to determine relative rights to the waters of the Umatilla River and tributaries. Decree rendered September 9, 1916, by circuit court of Umatilla County. Appeal taken by Western Land & Irrigation Co. Case pending.

OREGON-CALIFORNIA, KLAMATH PROJECT.

Klamath Lake Navigation Co. v. *California, Northeastern R. R. Co. and Southern Pacific R. R. Co.*—United States intervened September 30, 1910. Case pending.

In re determination water rights, Lost River.—Proceeding before State water board. Case pending.

SOUTH DAKOTA, BELLE FOURCHE PROJECT.

Widell-Finley Co. et al. v. *United States.*—Suit filed February 9, 1912, in Court of Claims for $226,852.02. Additional testimony taken during the past year. Case pending.

Belle Fourche Valley Water Users' Association v. *Magruder et al.*—Petition filed July 19, 1913, in State district court for injunction. Case pending.

Samuel R. H. Robinson v. *United States.*—Suit filed in November, 1913, in Court of Claims for $17,145.25. Additional testimony taken during the year. Case pending.

UTAH, STRAWBERRY VALLEY PROJECT.

No litigation.

WASHINGTON, OKANOGAN PROJECT.

United States v. *Mineral Hill Ditch Co.*—Suit filed April 18, 1915, in United States district court to quiet title and for an injunction. A compromise agreement has been made and judgment will be entered accordingly.

Town of Okanogan v. *United States and Calvin Casteel.*—Suit brought in the United States district court for the Eastern District of Washington for injunction restraining defendants from cutting off water supply from Shull Springs. Suit involves the interpretation of a water contract dated December 3, 1909. Case pending.

WASHINGTON, YAKIMA PROJECT.

Theodore Weisberger and wife v. *United States.*—Suit filed January 22, 1914, in Court of Claims, for $91,803.33. Evidence has been taken at various times during the year. Case pending.

United States v. *West Side Irrigating Co.*—Action brought June 25, 1912, in the United States district court for injunction. February 19, 1916, decision handed down enjoining the defendant from diverting water, except as follows: 80 second-feet between July 1 and September 30 of each year, and 34 second-feet during October. Case pending on appeal of defendant to Circuit Court of Appeals.

United States v. *Oswald S. Thomas.*—Suit filed June 28, 1916, in the United States district court for operation and maintenance charges due under the W. I. Co. water-right contract. Amount, $96.80. Case pending.

United States v. *F. L. Watson.*—Suit filed June 28, 1916, in United States district court for operation and maintenance charges under W. I. Co. water-right contract. Amount, $131.53. Case pending.

United States v. *William J. Duffy.*—Suit filed June 28, 1916, in United States district court for operation and maintenance charges under W. I. Co. water-right contract. Amount, $82.60. Case pending.

United States v. *Grant McLean.*—Suit filed June 29, 1916, in United States district court for operation and maintenance charges under W. I. Co. water-right contract. Amount, $46.48. Case pending.

WYOMING, JACKSON LAKE ENLARGEMENT.

United States v. *B. D. Sheffield.*—Suit filed June 20, 1914, in the Federal court to condemn lands. Under special act of Congress of January 28, 1916 (private No. 46), settlement has been made exchanging a small tract of public land for the private lands needed by the United States. Deeds conveying the private lands to the United States are in escrow. Transfer has been delayed pending elimination of certain defects in title.

WYOMING, SHOSHONE PROJECT.

United States Fidelity & Guaranty Co. v. *United States.*—Suit brought in 1912 in the Court of Claims for the recovery of $822,777.58. Plaintiff's brief filed January 22, 1917. Case pending.

* *United States* v. *Edison E. Kilgore.*—Suit brought in United States district court for $437.50, delinquent water charges. Amount paid into court and suit dismissed.

PURCHASES OF RIGHTS AND PROPERTY.

The following purchases of rights and property were made during the fiscal year ending June 30, 1917:

Purchases of rights and property.

ARIZONA , SALT RIVER PROJECT.

Vendor.	Description.	Consideration.	Date of deed.
Ming, E. D., and wife	Purchase of improvements on a tract of land in W. ½ NW. ¼, of sec. 35, T. 2 N., R. 3 E., G. & S. R. B. & M., Maricopa County, Ariz.	$150.00	Feb. 19, 1916
Peterson, J. G., and wife	Purchase of improvements and in full for damages of trespass in construction of a canal across a strip of land located in sec. 11, T. 1 S., R. 5 E., G. & S. R. B. & M., Maricopa County, Ariz.	25.00	June 12, 1914
White, E. M., and wife	Purchase of a tract of land containing 17.39 acres, more or less, located in the S. ½ S. ½ of sec. 9, T. 1 N., R. 5 E., G. & S. R. B. & M., Maricopa County, Ariz., together with all improvements thereon.	5,217.00	Feb. 24, 1916

ARIZONA-CALIFORNIA, YUMA PROJECT.

Theilmann, Martha H. and Robert H.	Improvements on land in W. ½ sec. 16, T. 10 S., R. 24 W., G. & S. R. B. & M.	$188.60	Sept. 23, 1916

COLORADO, GRAND VALLEY PROJECT.

Merritt, F. F	0.14 of an acre in NW. ¼ NW. ¼ sec. 2, T. 1 S., R. 1 W., Ute P. M.	$1.00	May 22, 1917

COLORADO, UNCOMPAHGRE VALLEY PROJECT.

	RIGHTS OF WAY.		
Bridges, Vernon C	1.20 acres in the N. ½ SW. ¼ sec. 22, T. 51 N., R. 11 W., N. M. P. M.	$1.00	June 30, 1916
Brown, A. J	0.43 of an acre in SW. ¼ SW. ¼ sec. 4, T. 50 N., R. 10 W., N. M. P. M.	1.00	Jan. 19, 1916
Brown, Andrew J	1.73 acres in S. ½ SE. ¼ sec. 5, T. 50 N., R. 10 W., N. M. P. M.	150.00	Sept. 7, 1916
Caseley, Grace E. and Walter M.	1.38 acres in NE. ¼ NE. ¼ sec. 31, T. 51 N., R. 10 W., N. M. P. M.	120.00	June 8, 1916
Chilson, W. W	0.18 of an acre in NE. ¼ sec. 35, T. 51 N., R. 11 W., N. M. P. M.	1.00	Aug. 30, 1916
Cotter, J. E	3.56 acres in SW. ¼ NW. ¼, SE. ¼ NW. ¼, NE. ¼ SW. ¼ sec. 5, T. 50 N., R. 10 W., N. M. P. M.	475.00	July 1, 1916
Craig, Mrs. J. O	0.61 of an acre in W. ½ SE. ¼ sec. 35, T. 51 N., R. 11 W., N. M. P. M.	61.00	Nov. 28, 1916
Crockett, Katherine M	0.12 of an acre in N. ½ NW. ¼ NE. ¼, sec. 35, T. 51 N., R. 11 W., N. M. P. M.	10.00	Nov. 16, 1916
Dickerson, Ella	Three tracts aggregating 1.20 acres in NW. ¼ SE. ¼ sec. 5, T. 50 N., R. 10 W., N. M. P. M.	125.00	July 31, 1916
Do	Two tracts aggrerating 0.34 acre in SE. ¼ SE. ¼, sec. 5, T. 50 N., R. 10 W., N. M. P. M.	1.00	Nov. 8, 1915
Dunmire, Harve E	1.58 acres in W. ½ NE. ¼ NE. ¼ and E. ½ NW. ¼ NE. ¼, S. 17, T. 50 N., R. 10 W., N. M. P. M.	150.00	July 1, 1916
Gaines, Susan C., and Hubbard, Geo.	1.08 acres in W. ½ NE. ¼ NE. ¼, S. 13, T. 50 N., R. 11 W., N. M. P. M.	80.00	Apr. 26, 1917
Gish, Ruth O	1.51 acres in E. ½ NW. ¼ and 1.07 acres in NW. ¼ NE. ¼, S. 20, T. 50 N., R. 9 W., N. M. P. M.	1.00	Apr. 14, 1916
Harnish, O. P	0.18 of an acre in SW. ¼, S. 35, T. 51 N., R. 11 W., N. M. P. M.	1.00	Aug. 28, 1916

Purchases of rights and property—Continued.

COLORADO UNCOMPAHGRE VALLEY PROJECT—Continued.

Vendor.	Description.	Consideration.	Date of deed.
	RIGHTS OF WAY—continued.		
Heinze, Adelbert and Catherine.	1.28 acres in SW. ¼ NW. ¼, S. 27, T. 51 N., R. 11 W., N. M. P. M.	$187.00	Nov. 13, 1916
Hutson, Clarence	1.91 acres in E. ½ NE. ¼ NE. ¼, S. 13, T. 50 N., R. 11 W., N. M. P. M.	50.00	Apr. 26, 1917
Ironstone Shortline Ditch Co.	Ironstone Shortline ditch	1.00	Feb. 1, 1917
Jackson, George	0.99 acre in SW. ¼ NE. ¼, S. 21, T. 51 N., R. 11 W., N. M. P. M.	1.00	June 29, 1916
Loesch, Frank J	0.2 of an acre in NW. ¼ SE. ¼, S. 21, T. 49 N., R. 10 W., N. M. P. M.	1.00	Jan. 30, 1916
McCoy, Susan	0.26 of an acre in NE. ¼ SW. ¼, S. 3, T. 50 N., R. 11 W., N. M. P. M.	40.00	Apr. 4, 1917
McIntire, Martin L	0.18 of an acre in E. ½ SE. ¼ SE. ¼, S. 8, T. 50 N., R. 10 W., N. M. P. M.	1.00	May 4, 1916
McKnight, Geo. A	0.87 of an acre in E. ½ NW. ¼, S. 2, T. 50 N., R. 11 W., N. M. P. M.	152.00	Jan. 13, 1917
McMillan, C. A	0.75 of an acre in S. ½ SW. ¼, S. 22, T. 51 N., R. 11 W., N. M. P. M.	36.00	Nov. 25, 1916
McMillan, Isabella	1.05 acres in NW. ¼ NW. ¼, S. 22, T. 51 N., R. 11 W., N. M. P. M.	1.00	Aug. 11, 1916
Meldrum, Alex S	0.12 of an acre in SW. ¼ SE. ¼, S. 26, T. 51 N., R. 11 W., N. M. P. M.	1.00	Sept. 6, 1916
Murray, Floy	1.04 acres in E. ½ SE. ¼, S. 19, T. 51 N., R. 10 W., N. M. P. M.	50.00	June 8, 1916
Murray, Melissa and James E.	0.36 of an acre in SE. ¼ SE. ¼, S. 19, T. 51 N., R. 10 W., and 1.92 acres in NE. ¼ NE. ¼, S. 30, T. 51 N., R. 10 W., N. M. P. M.	125.00	Jan. 29, 1917
Porter, Robert M. and Alma E	0.12 of an acre in SW. ¼ SE. ¼, S. 26, T. 51 N., R. 11 W., N. M. P. M.	1.00	June 29, 1916
Schaefer, Adam and Frances	Two tracts of land aggregating 2.51 acres in SW. ¼, S. 14, T. 51 N., R. 11 W., N. M. P. M.	85.00	Jan. 29, 1917
Selig Investment Co	1.33 acres in E. ½ NW. ¼, S. 3, T. 50 N., R. 11 W., N. M. P. M.	200.00	Nov. 13, 1916
Stringer, Robt. S	0.34 of an acre in SE. ¼ SE. ¼, S. 21, T. 49 N., R. 10 W., N. M. P. M.	1.00	Nov. 14, 1916
Twitchell, Rosa	Two tracts of land, aggregating 2.24 acres in the N. ½ NW. ¼, S. 27, T. 51 N., R. 11 W., N. M. P. M.	100.00	Nov. 13, 1916
Wilson, A. E., and Kellenberger, G. H.	1.29 acres in W. ½ NE. ¼, S. 3, T. 50 N., R. 11 W., N. M. P. M.	194.00	Nov. 10, 1916
Winebright, C. M. and Anna	1.06 acres in SW. ¼ SW. ¼, S. 15, T. 51 N., R. 11 W., N. M. P. M.	30.00	Nov. 15, 1916
Zanardi, Paul, and Frisa, Tony.	0.25 of an acre in NW. ¼ SE. ¼, S. 26, T. 51 N., R. 11 W., N. M. P. M.	1.00	June 29, 1916

Vendor.	Loutsenhizer water rights (amount in second-feet.)	Consideration.	Date of deed.
Carter, R. L	0.9375	$750.00	Oct. 9, 1916
Champion, M. J. and W. H	.1125	90.00	Aug. 25, 1916
Dillon, Hallie	.50	400.00	May 12, 1917
Love, R. E	.8281	662.50	Aug. 30, 1916
Lupher, S. B	1.50	1,200.00	Aug. 23, 1916
Meyers, Geo. L. and Cora M	1.00	800.00	July 13, 1916
Mitchell, E. S	.1562	125.00	Sept. 7, 1916
Quiller, August	1.00	800.00	Mar. 9, 1917
Rinehimer, A. C	.50	400.00	Nov. 14, 1916
Satisfaction Title & Investment Co	.50	400.00	June 21, 1916
Schermerhorn, Jannette and Fred	1.50	1,200.00	Sept. 2, 1916
Singleton, Walter	.2343	187.50	Oct. 25, 1916
Thompson, Richard C. and Mattie E	.05625	45.00	Oct. 7, 1916
Veith, Raphael	1.00	800.00	Apr. 26, 1917

Purchasers of rights and property—Continued.

IRONSTONE AND IRONSTONE EXTENSION WATER RIGHTS REPRESENTED BY SHARES OF STOCK.

Vendor.	Number of shares Ironstone.	Number of shares Extension.	Consideration.	Date of deed.
Andregg, U	1	.....	$400.00	Dec. 18, 1916
Austin, Frank H	1	.....	400.00	Nov. 7, 1916
Berry, Steve W	1	.....	400.00	Oct. 28, 1915
Brew, Thomas C	5	5	2,000.00	Dec. 1, 1916
Brown, George H	⅝	.....	250.00	July 15, 1916
Dannels, Kenzy O	1	.....	400.00	Nov. 25, 1916
Dolan, Mary M	⅞	.....	350.00	July 15, 1916
Dopp, Mildred, estate of	2	.....	800.00	Sept. 8, 1916
Harvey, Joseph	3	3	1,200.00	Jan. 24, 1916
Heaton, Verna A	1	.....	400.00	Sept. 18, 1916
Neil, J. R	5	.....	2,000.00	Oct. 31, 1916
Niles, John W	½	.....	200.00	June 1, 1916
Ray, Charles E	5	5	2,000.00	Dec. 1, 1916
Ridgeway, Amos C	2	1	800.00	Oct. 23, 1916
Shaner, W. L	1	1	400.00	June 7, 1917
Zanardi, Paul, and Frisia, Antonia	2	.....	800.00	Nov. 11, 1916

IDAHO, BOISE PROJECT.

Vendor.	Description.	Consideration.	Date of contract.
Amack, E. G	Right of way across E. ½ SE. ¼ SE. ¼, E. ½ W. ½ SE. ¼ SE. ¼, E. ½ W. ½ W. ½ SE. ¼ SE. ¼, sec. 35, T. 4 N., R. 2 W.	Bridge, valued at $125.	Dec. 5, 1916
Anson, Fred B	Right of way across NE. ¼ SE. ¼, sec. 3, T. 2 N., R. 2 W.	.....do.....	June 23, 1916
Asselin, Damase	Right of way across NW. ¼ SE. ¼, sec. 33, T. 3 N., R. 2 W.	.....do.....	Do.
Bean, Cora B	SW. ¼ SE. ¼ SW. ¼, sec. 28, T. 4 N., R. 3 W., containing 1.46 acres.	$180	Jan. 14, 1916
Bedal, Eugene L	Right of way across SW. ¼ NE. ¼ and E. ½ SE. ¼, sec. 8, T. 3 N., R. 1 W.	Bridge, valued at $125.	Aug. 7, 1916
Bennett, W. A	Settlement for Ten Mile Creek water right used on N. ½ SE. ¼ SE. ¼, sec. 6, T. 3 N., R. 1 W., destroyed by drain.	$750	Apr. 5, 1916
Betts, David	A strip of land in the SW. ¼ SW. ¼, sec. 25, and N. ½ N. ½, sec. 36, T. 4 N., R. 2 W., containing 10.05 acres.	Bridge and two flumes, valued at $160.	Feb. 5, 1916
Boone, Lafe	A strip of land in the SE. ¼ NW. ¼ and NW. ¼ NW. ¼, sec. 13, T. 3 N., R. 1 W.	Two bridges valued each at $125.	Mar. 3, 1917
Booth, Norville W	Settlement for Ten Mile Creek water right used on SE. ¼ SE. ¼, E. ½ SW. ¼ SE. ¼, NW. ¼ SE. ¼, SW. ¼ NE. ¼, SE. ¼ NW. ¼, sec. 10, T. 3 N., R. 1 W., destroyed by drain.	$3,840	July 31, 1916
Booth, Norville W., and Charles S. Meek.	A strip of land in the SW. ¼ NE. ¼ and SE. ¼ NW. ¼, sec. 10, T. 3 N., R. 1 W., containing 7.70 acres.	Three bridges, at $125, one bridge, at $50.	Sept. 20, 1916
Brown, Elmo A., and Alfred B. Mayhew.	A strip of land in the NE. ¼, sec. 31, T. 4 N., R. 1 W., containing 4.73 acres.	$573	Nov. 3, 1916
Do	A strip of land in the S. ½ NE. ¼, sec. 31, T. 4 N., R. 1 W., containing 1.23 acres.	$60	Feb. 7, 1916
Byers, J. J., heirs of	A strip of land in the E. ½ SE. ¼, SW. ¼, sec. 29, T. 3 N., R. 1 E., containing 0.08 acre.	$1	Jan. 15, 1917
Cairns, Floyd	A strip of land in the SW. ¼ NW. ¼, sec. 1, T. 3 N., R. 1 W.	Bridge, valued at $150.	Apr. 11, 1917
Cairns, Floyd, and wife	Settlement for Five Mile Creek water right used on S. ½ NE. ¼, sec. 2, T. 3 N., R. 1 W., destroyed by drain.	$450	Apr. 15, 1916
Corwin, L. W	Right of way across NE. ¼ NE. ¼, sec. 9, T. 3 N., R. 1 W.	Bridge, valued at $125.	Feb. 27, 1917
Cox, Fannie, heirs of	Right of way across NW. ¼ sec. 29, T. 4 N., R. 3 W., containing 8.79 acres.	Brideg and flume, valued at $155.	Apr. 5, 1916
Davis, R. F	Right of way across N. ½ S. ½ NE. ¼ sec. 1, T. 3 N., R. 2 W., B. M.	Bridge, valued at $125.	Sept. 26, 1916
Day, H. H. and Frank	Right of way across S. ½ SW. ¼ NE. ¼ sec. 3, T. 2 N., R. 2 W.	.....do.....	June 23, 1916

Purchases of rights and property—Continued.

IDAHO, BOISE PROJECT—Continued.

Vendor.	Description.	Consideration.	Date of contract.
Downey, W. F	Settlement for Five Mile Creek water right used on S. ½ SE. ¼ sec. 34, T. 4 N., R. 1 W., destroyed by drain ditch.	$337.50	Apr. 16, 1917
Drake, W. P	A strip of land in S. ½ SE. ¼ sec. 35, T. 4 N., R. 1 W., containing 1.1 acres.	$290	Mar. 20, 1917
Estes, A. Iloe	A strip of land in the SW. ¼ SE. ¼ sec. 29, T. 3 N., R. 1 E., containing 2.52 acres.	$175	Apr. 18, 1917
Everitt, George H., and W. W. Snell.	A strip of land in lot 7, sec. 28, T. 3 N., R. 2 W., containing 1.60 acres.	Bridge, valued at $125.	Mar. 1, 1916
Forch, Jacob	A strip of land in the S. ½ SE. ¼ SE. ¼ sec. 6, T. 3 N., R. 1 W., containing 1.82 acres.	$91	Dec. 4, 1915
Freeman, Edward	Right of way across SE. ¼ NW. ¼ sec. 27, T. 4 N., R. 2 W.	Bridge, valued at $125.	July 27, 1916
Gilbert, E. L., and A. L. Hancock.	Right of way across SW. ¼ sec. 12, T. 3 N., R. 1 W.	do	Feb. 8, 1917
Grant, Augusta Lemp, and Ada Lemp Hurt.	A strip of land in the NE. ¼ NE. ¼ sec. 34, T. 4 N., R. 2 W., containing 3.79 acres.	$430	Sept. 7, 1916
Griffiths, Walter	A strip of land in the SW. ¼ NW. ¼ sec. 20, T. 4 N., R. 2 W., containing 3.12 acres.	$1	Dec. 23, 1915
Hall, William A., and George Murray.	A strip of land in the S. ½ NE. ¼ sec. 20, T. 4 N., R. 2 W., containing 6.58 acres.	Material for bridge, valued at $85.	Jan. 10, 1916
Haltom, Fannie	A strip of land in the S. ½ S. ½ sec. 26 and N. ½ N. ½ sec. 35, T. 4 N., R. 2 W., containing 16.09 acres.	3 bridges, 6 flumes, valued at $1,060.	Jan. 8, 1916
Hamilton, J. H	Right of way across NW. ¼ SE. ¼ sec. 35, T. 4 N., R. 2 W.	Bridge, valued at $125.	July 27, 1916
Harrell, L. R	Damage to improvements on N. ½ SW. ¼ sec. 4, T. 3 N., R. 1 W.	$60	Dec. 6, 1916
Hedges, Wm., and wife, and Ralph Hedges and wife.	A strip of land in the NW. ¼ SE. ¼ sec. 12, T. 3 N., R. 1 W., containing 0.12 acre.	$55	Mar. 11, 1916
Hendershot Land & Live Stock Co.	A strip of land in the E. ½ SE. ¼ sec. 1, T. 3 N., R. 1 W., containing 4.47 acres.	$785	Apr. 7, 1916
Do	A strip of land in the W. ½ SE. ¼ sec. 1, T. 3 N., R. 1 W., containing 4.59 acres.	$1	Nov. 16, 1916
Hollenberg, Wm. F	A strip of land in the NE. ¼ sec. 31, T. 4 N., R. 1 W., containing 4.08 acres.	$300	Jan. 15, 1916
Horton, R. H	Right of way across SW. ¼ SW. ¼ NE. ¼ sec. 13, T. 3 N., R. 1 W.	Bridge, valued at $125.	Dec. 13, 1916
Horton, R. H., and R. E. Pettet.	Right of way across SW. ¼ NE. ¼ and NW. ¼ SE. ¼ sec. 13, T. 3 N., R. 1 W.	do	Mar. 3, 1917
Hull, A. R	A strip of land in the S. ½ NW. ¼ sec. 35, T. 4 N., R. 2 W., containing 5 acres.	$375	May 5, 1916
Johnson, J. R	Right of way across W. ½ NE. ¼ NW. ¼ sec. 1, T. 3 N., R. 2 W.	Bridge, valued at $125.	Aug. 16, 1916
Jones, Fannie	Right of way across E. ½ SW. ¼ sec. 2, T. 3 N., R. 1 W.	do	Dec. 5, 1916
Kindred, C. D	Damage to improvements destroyed by break in main canal.	$20	Dec. 6, 1916
King, Ohio	Right of way across SE. ¼ SE. ¼ sec. 13, T. 3 N., R. 1 W.	Bridge, valued at $125.	Dec. 20, 1916
Langdon, George	A strip of land in the S. ½ SW. ¼ sec. 36, T. 3 N., R. 2 W., containing 3.76 acres.	$400	May 13, 1916
Lewis, Nan	Right of way across W. ½ NW. ¼ NW. ¼ sec. 1 T. 3 N., R. 1 W.	2 bridges, valued at $250.	Mar. 15, 1917
Linville, W. M	A strip of land in the W. ½ NE. ¼ SW. ¼ sec. 29, T. 3 N., R. 1 E., containing 2.90 acres.	$400	Jan. 22, 1917
Lynch, Elizabeth	A strip of land in the E. ½ SW. ¼ sec. 10, T. 3 N., R. 1 W., containing 2.51 acres.	$251	June 28, 1916
McCoy, Eugene	A strip of land in the N. ½ NE. ¼ sec. 11, T. 3 N., R. 1 W., containing 4.43 acres.	$588	Mar. 21, 1916
McHose, Harry W	Right of way across NE. ¼ NW. ¼ sec. 3, T. 2 N., R. 2 W.	Bridge, valued at $125.	June 23, 1916
McKinnis, Robert	A strip of land in the NW. ¼ SW. ¼ sec. 29, T. 3 N., R. 1 E., containing 0.48 acre.	$1	Jan. 3, 1917
McKinnis, George A	A strip of land in the E. ½ SE. ¼ SW. ¼ sec. 29, T. 3 N., R. 1 E., containing 2.10 acres.	$1	Feb. 20, 1917
Marcum, W. E	A strip of land in the SE. ¼ NE. ¼ sec. 33, T. 4 N., R. 1 W., containing 2.41 acres.	$125	Feb. 12, 1916
Miller, Ira	A strip of land in the S. ½ sec. 27, T. 4 N., R. 2 W., containing 6.87 acres.	$800	Apr. 1, 1916
Munhall, T. E	A strip of land in lot 3, sec. 28, T. 3 N., R. 2 W., containing 1.06 acres.	Bridge, valued at $125.	Mar. 1, 1916
Murray, A. B	Right of way across SW. ¼ SE. ¼ sec. 6, T. 3 N., R. 1 W.	do	Apr. 25, 1917

Purchases of rights and property—Continued.

IDAHO, BOISE PROJECT—Continued.

Vendor.	Description.	Consideration.	Date of contract.
Murray, George	A strip of land in the SE. ¼ NW. ¼ sec. 20, T. 4 N., R. 2 W., containing 3.48 acres.	Material for bridge, valued at $85.	June 8, 1916
Neet, James N	A strip of land in the S. ½ S. ½ NE. ¼ sec. 1, T. 3 N., R. 2 W.	Bridge, valued at $125.	Dec. 6, 1916
Nelson, James C	A strip of land in the S. ½ SW. ¼ and SW. ¼ SE. ¼ sec. 5, T. 3 N., R. 1 W., containing 4.62 acres.	1 bridge, 2 flumes, 6 waste ways, and cash, $665.	Mar. 27, 1916
Newcomer, J. H	Right of way across NE. ¼ SW. ¼ sec. 12, T. 3 N., R. 1 W.	Bridge, valued at $125.	Dec. 20, 1916
Newhouse, C. D	A strip of land in the E. ½ NE. ¼ NE. ¼ sec. 14, T. 3 N., R. 1 W., containing 1.88 acres.	1 flume and cash, $338.	Mar. 31, 1916
Noble, Robert, heirs	A strip of land in the SW. ¼ SW. ¼ sec. 15, T. 3 N., R. 2 W., containing 3.11 acres.	$1	Oct. 8, 1915
Nusbaum, Fred	A strip of land in the NW. ¼ SE. ¼ sec. 12, T. 3 N., R. 1 W., containing 0.15 acre.	$70	Dec. 15, 1915
Partridge, H. A	Right of way across SW. ¼ NE. ¼, NW. ¼ SE. ¼, NE. ¼ SW. ¼, and SE. ¼ NW. ¼, sec. 35, T. 3 N., R. 2 W.	Bridge, valued at $125.	July 27, 1916
Pfaffle, E. C	Right of way across SE. ¼ SW. ¼ sec. 4, T. 3 N., R. 1 W.	.....do	Aug. 5, 1916
Do	Right of way across SE. ¼ NW. ¼ and NE. ¼ SW. ¼ sec. 19, T. 3 N., R. 1 E., B. M.	.....do	Jan. 16, 1917
Pipher, John	Right of way across SE. ¼ SE. ¼ sec. 3, T. 2 N., R. 2 W.	.....do	July 26, 1916
Pleasants, W. A	A strip of land in lots 9 and 16, 3 and 6 and 8, sec. 28, T. 3 N., R. 2 W., containing 4.59 acres.	$1	Nov. 20, 1916
Powell, George	A strip of land in the NW. ¼ SE. ¼ sec. 12, T. 3 N., R. 1 W., containing 0.44 acre.	$165	Dec. 15, 1915
Powell, William A	A strip of land in the S. ½ NW. ¼ sec. 34, T. 4 N., R. 1 W., containing 4.93 acres.	$155	Dec. 4, 1916
Ragon, David M	Settlement for Five Mile Creek water right used on east 55 acres of S. ½ SE. ¼ sec. 34, T. 4 N., R. 1 W.	$562.50	Apr. 24, 1917
Ragon, D. M	A strip of land in S. ½ SE. ¼ sec. 34, T. 4 N., R. 1 W., containing 9.36 acres.	2 bridges, valued at $225.	Sept. 28, 1915
Rasmussen, J. E	A strip of land in the SW. ¼ NE. ¼ sec. 7, T. 3 N., R. 1 W., containing 0.39 acre.	$1	June 5, 1916
Rea, Chas. H	Right of way across S. ½ NE. ¼ sec. 32, T. 3 N., R. 1 E.	Bridge, valued at $125.	Apr. 25, 1917
Records, F. L	A strip of land in the E. ½ SW. ¼ sec. 34, T. 4 N., R. 1 W., containing 6.29 acres.	1 bridge, 2 flumes, and cash, $475.	Jan. 11, 1916
Rivett, Andrew	Right of way across NE. ¼ NW. ¼ and NW. ¼ NE. ¼ sec. 2, T. 2 N., R. 2 W.	Bridge, valued at $125.	July 27, 1916
Roan, Hans J	Right of way across SW. ¼ sec. 32, T. 4 N., R. 1 W.	Bridges (two), valued at $250.	Jan. 31, 1917
Rupert, Ira D	A strip of land in the NW. ¼ NW. ¼, sec. 35, T. 4 N., R. 2 W., containing 0.73 acre.	$65	June 27, 1916
Sample, S. H	Right of way across W. ½ SE. ¼ sec. 32, T. 4 N., R. 1 W.	Bridge valued at $125.	Jan. 17, 1917
Schey, Wendelin	A strip of land in the S. ½ NE. ¼ sec. 7, T. 3 N., R. 1 W., containing 0.79 acre.	$1	June 3, 1916
Sims, Elmer E	Right of way across W. ½ SE. ¼ and S. 30 acres in SE. ¼ SE. ¼ sec. 19, T. 3 N., R. 1 E	Bridge valued at $125.	Jan. 16, 1917
Smith, Clifford J	Right of way across NE. ¼ NW. ¼ sec. 1, T. 3 N., R. 2 W.	.....do	July 27, 1916
Stalker, Emaline	Right of way across NW. ¼ NW. ¼ sec. 14, T. 3 N., R. 1 W.	.....do	Dec. 6, 1916
Stanton, J. F	A strip of land in the NW. ¼ SE. ¼ sec. 12, T. 3 N., R. 1 W., containing 1.5 acres.	$300	Dec. 15, 1915
Thurman, Wm. L., jr	Right of way across NE. ¼ NE. ¼ sec. 30, T. 3 N., R. 1 E.	Bridge valued at $125.	Jan. 16, 1917
Tobias, Charles C	A strip of land in the N. ½ SW. ¼ SW. ¼ sec. 35, T. 4 N., R. 1 W., containing 4.56 acres.	2 runways and cash, $601.	Mar. 30, 1916
Waugh, John E., and Cammie L. Miller.	Right of way across SW. ¼ SW. ¼ and part of NW. ¼ SW. ¼ sec. 10, T. 3 N., R. 1 W.	Bridge valued at $125.	Dec. 5, 1916
Western National Bank	Right of way across E. ½ NW. ¼ sec. 29, T. 4 N., R. 2 W.	.....do	Nov. 12, 1915
Wills, James E	A strip of land in the W. ½ SE. ¼ SW. ¼ sec. 29, T. 3 N., R. 1 E., containing 0.33 acre.	$1	Feb. 20, 1917
Wray, Wm. J	Right of way across W. ½ of lot 2, West Lawn subdivision of SW. ¼, sec 12, T. 3 N., R. 1 W.	Bridge valued at $125.	Feb. 8, 1917
Young, Fay D	A strip of land in the N. ½ SE. ¼ sec. 12, T. 3 N., R. 1 W., containing 0.08 acre.	$25	Dec. 24, 1915

Purchases of rights and property—Continued.

IDAHO, MINIDOKA PROJECT.

Vendor.	Description.	Consideration.	Date of contract.
Ames, Solen E., and Alonso F. Ames.	Purchase of lateral 193-6, sec. 2, T. 10 S., R. 22 E.	$150.00	Jan. 27, 1917
Ames, A. F.	Damage to improvements, farm unit D, S. ½ NW. ¼ sec. 1, T. 10 S., R. 22 E.	69.50	Oct. 20, 1916
Clayville, Irl G.	Damage to improvements, farm unit A, E. ½ NE. ¼, sec. 2, T. 10 S., R. 22 E.	60.50	Do.
Crystal Sand & Gravel Co.	NE. ¼ SE. ¼ sec. 19, T. 10 S., R. 23 E., containing 0.122 acre.	122.00	Dec. 28, 1914
Griffith, W. W.	Damage to crop caused by break in C2 Canal	134.40	Apr. 6, 1917
Grimm, Henry	Purchase of lateral 1521A, sec. 31, T. 9 S., R. 23 E.	40.00	Aug. 25, 1916
Johns, Wm. T.	Purchase of lateral 37A, sec. 20, T. 9 S., R. 25 E.	60.00	Jan. 31, 1917
Whittle, Thomas	Purchase of lateral 212, sec. 31, T. 8 S., R. 25 E.	65.00	Aug. 22, 1916

MONTANA, FLATHEAD (INDIAN) PROJECT.

Matt, Emily Glover, and Louis J. Matt.	Damage to improvements on allotment No. 759, S. ½ NE. ¼ sec. 29, T. 22 N., R. 20 W., M. P. M.	$788.00	Feb. 1, 1917

MONTANA, HUNTLEY PROJECT.

Aesdale, Wilson J.	Improvements on 2.80 acres in SE. ¼ SE. ¼ sec. 32, T. 3 N., R. 29 E., M. P. M.	$84.00	Apr. 20, 1917
Brown, Jas. H.	Improvements on 0.80 acre in W. ½ lot 2, sec. 4, T. 2 N., R. 29 E., M. P. M.	24.00	Mar. 30, 1917
Graham, H. H.	Improvements on 0.80 acre in E. ½ SW. ¼ SE. ¼ sec. 32, T. 3 N., R. 29 E., M. P. M.	24.00	Apr. 17, 1917
Savage, Charles D, and Katie A., his wife.	Improvements on 1.10 acres in NE. ¼ SE. ¼ sec. 32, T. 3 N., R 29 E., M. P. M.	33.00	Mar. 30, 1917
Ware, Isaac, and Mary F., his wife.	Improvements on 1.5 acres in SE. ¼ SW. ¼ sec. 32, T. 3 N., R. 29 E., M. P. M.	45.00	Do.

MONTANA, MILK RIVER PROJECT, ST. MARY STORAGE UNIT—LANDS PURCHASED FOR ST. MARY CANAL.

Vendor.	Description.		Consideration.	Date of deed.
Blackfeet Indian tribe	NE. ¼ sec. 30, T. 37 N., R. 13 W., 52.9 acres.	$423.20		(1)
Do	NW. ¼ sec. 29, T. 37 N., R. 13 W. (drawing No. S. 5345), 26.4 acres.	211.20		(1)
Do	NE. ¼ sec. 15, T. 37 N., R. 12 W. (drawing No. St. M. 752), 0.7 acre.	5.60		(1)
Do	E. ½ sec. 5, T. 37 N., R. 11 W., (drawing No. S. 5347), 35.9 acres.	287.20		(1)
Do	SW. ¼ sec. 4, T. 37 N., R. 11 W., (drawing No. S. 5350), 3.5 acres.	28.00		(1)
	Total, 119.4 acres	955.20		
	Less credit by amount paid for right of way on east side of St. Mary River through T. 36 and 37 N., R. 14 W., M. M., Montana, which right of way has been abandoned	408.90		
			$546.30	
Douglas, Arthur	Allotment No. 2165, 0.5 acre		4.00	(1)
Dubray, Alex	Allotment No. 2134, 22.3 acres		223.00	(1)
Dubray, Catherine	Allotment No. 2140, 54.6 acres		436.80	(1)

[1] Lands purchased were tribal and allotted lands of the Blackfeet Indians. Allotments on Blackfeet Reservation have not yet been approved. Transfer was made by approval of the Indian Office. Payment was made June 27, 1917.

Purchases of rights and property—Continued.

MONTANA-NORTH DAKOTA, LOWER YELLOWSTONE PROJECT.

Vendor.	Description.	Consideration.	Date of deed.
Nelson, Nels H. and wife	2.27 acres of land in sec. 35, T. 19 N., R. 57 E., M. P. M.	$1.00	Sept. 14, 1916
Northwestern Improvement Co.	1.15 acres of land in sec. 35, T. 19 N., R. 57 E., M. P. M.	1.00	Oct. 23, 1916
Rhode, George L	153.48 acres of land in sec. 30, T. 24 N., R. 60 E., M. P. M.	12,500.00	June 7, 1917

NEBRASKA-WYOMING, NORTH PLATTE PROJECT.

Catlin, George S., and wife	Flowage right in sec. 15, T. 27 N., R. 66 W., 6th P. M.	$750.00	Mar. 26, 1917
Fisher, William B., and wife.	Right of way for drainage ditch across N. ½ SE. ¼ sec. 20, T. 22 N., R. 53 W., 6th P. M.	162.50	

NEVADA, TRUCKEE-CARSON PROJECT.

Central Pacific Railway Co.	1,111.2 acres	$1,389.00	May 12, 1917

NEW MEXICO-TEXAS, RIO GRANDE PROJECT.

Bassett, C. N., et ux	Tract of land in secs. 11 and 12, T. 32 S., R. 6 E., N. M. P. M., containing 2.855 acres.	$214.00	Oct. 3, 1916
Bruhn, H., et ux	Tract of land in sec. 4, T. 26 S., R. 3 E., N. M. P. M., containing 9.50 acres.	1.00	Apr. 14, 1917
Bruhn, H., ex. est. J. P. Dieter, deceased.	Tract of land in sec. 10, T. 26 S., R. 3 E., N. M. P. M., containing 7.71 acres.	1.00	Do.
Clint community ditch	Entire ditch system	1.00	Jan. 9, 1917
Cobos, Jesus	Tract of land in sec. 4, T. 34 S., R. 8 E., N. M. P. M., containing 2.6 acres.	1.00	Oct. 11, 1916
Graham, J. E	Tract of land, being part of lot 6, block 12, Buvons addition to town of Dona Ana, N. Mex.	50.00	Oct. 10, 1916
Hoagland, Edw. B., et ux	Tract of land in secs. 9 and 16, T. 22 S., R. 1 E., N. M. P. M., containing 2.65 acres.	291.50	July 1, 1916
Do	Tract of land in sec. 16, T. 22 S., R. 1 E., N. M. P. M., containing 1.76 acres.	202.40	Aug. 25, 1916
Hoagland, Edw. B., et ux. et al.	Tract of land in secs. 9 and 16, T. 22 S., R. 1 E., N. M. P. M., containing 0.91 of an acre.	104.65	Nov. 15, 1916
Krakauer, Mrs. J., by Attorney J. Krakauer.	Tract of land in secs. 19 and 18, T. 33 S., R. 8 E., U. S. R. S. survey, containing 10.37 acres, and tract of land in sec. 18, T. 33 S., R. 8 E., U. S. R. S. survey, containing 2.44 acres.	1.00	June 20, 1917
Loomis, Chas. R., and Chas. J. Mapel.	Tract of land containing 2.2 acres for right of way for East River drain.	1.00	July 8, 1916
Miller, Chas. E., et ux	Tract of land in sec. 26, T. 26 S., R. 3 E., N. M. P. M., containing 9.83 acres.	1.00	Oct. 5, 1916
Do	Tract of land in sec. 35, T. 26 S., R. 3 E., N. M. P. M., containing 0.10 of an acre.	1.00	Do.
Mitchell, Annie E., and Francis Nicholson.	Tract of land containing 6.43 acres; right of way for East River drain.	1.00	Dec. 27, 1916
Newman, C. M., et ux	Tract of land in sec. 2, T. 32 S., R. 6 E., N. M. P. M., containing 1.146 acres.	200.00	Sept. 8, 1916
Phillips, Pattie F., et al	Tract of land in sec. 16, T. 22 S., R. 1 E., N. M. P. M., containing 1.58 acres.	134.30	Aug. 29, 1916
Ruelas, Rodrigo D., et al	Tract of land in secs. 12 and 13, T. 24 S., R. 1 E., N. M. P. M., containing 33.69 acres.	650.00	[1] June 1, 1916
Salitral community ditch	Entire ditch system	1.00	Jan. 13, 1917
San Elizario community ditch.	....do	1.00	Jan. 9, 1917
San Jose, Pena, and Juan de Herrera community ditch.	....do	1.00	Jan. 10, 1917
Sperry, Fay, et ux	Tract of land in sec. 7, T. 26 S., R. 3 E., N. M. P. M., containing 4.70 acres.	620.00	[1] June 28, 1916
Thomas, J. G., et ux., and Robert McMordie, et ux.	Tract of land in sec. 22 and sec. 15, T. 26 S., R. 3 E., N. M. P. M., containing 7.70 acres.	385.00	Mar. 28, 1917
Thompson Community ditch.	Entire ditch system	1.00	Apr. 9, 1917
White, Battelle, et ux	Tract of land in sec. 4, T. 26 S., R. 3 E., N. M. P. M., containing 8.29 acres.	1.00	June 20, 1917

[1] Sent for signature, but not returned in time to be included in last annual report.

Purchases of rights and property—Continued.

OREGON, UMATILLA PROJECT.

Vendor.	Description.	Consideration.	Date of deed.
Marshall, E. P.	Improvements on NE. ¼ and SE. ¼ sec. 2, T. 4 N., R. 29 E., W. M.	$993.70	Oct. 13, 1916

OREGON-CALIFORNIA, KLAMATH PROJECT.

Adamek, Frank, et ux.	Part lot 5, sec. 17, T. 41 S., R. 12 E., W. M.	$1.00	June 27, 1917
Adams, C. M.	Improvements on part E. ½ NW. ¼ sec. 19, T. 39 S., R. 10 E., W. M.	100.00	Jan. 15, 1917
Allison, M. L., et al.	Part N. ½ SW. ¼ and SE. ¼ SW. ¼ sec. 2, T. 40 S., R. 9 E., W. M.	1.00	Apr. 10, 1917
Balin, Mary (widow).	Part NW. ¼ NE. ¼ and NE. ¼ NW. ¼ sec. 13, T. 40 S., R. 9 E., W. M.	1.00	May 18, 1917
Bunting, C. A., et ux.	SW. ¼ NE. ¼ sec. 15, T. 40 S., R. 9 E., W. M.	500.00	May 17, 1917
Cacka, John, et ux.	Part SW. ¼ NE. ¼ and SE. ¼ NW. ¼ sec. 7, T. 41 S., R. 12 E., W. M.	1.00	June 22, 1917
Cacka, Nettie, et vir.	Part lot 2, sec. 7, T. 41 S., R. 12 E., W. M.	1.00	Do.
Cheyne, Alexander, et ux.	Part NE. ¼ NW. ¼ sec. 11, T. 40 S., R. 9 E., W. M.	1.00	Apr. 7, 1917
Davis, Rose B., et vir.	Part SE. ¼ NW. ¼ sec. 3, T. 39 S., R. 9 E., W. M.	1.00	Aug. 4, 1916
	Improvements on above land.	100.00	Oct. 30, 1916
Dixon, J. R., et ux.	Part SE. ¼ NE. ¼ sec. 23, T. 39 S., R. 9 E., W. M.	1.00	Apr. 18, 1917
Dobry, Mike, et ux.	Part SW. ¼ NW. ¼ sec. 8, T. 41 S., R. 12 E., W. M.	1.00	June 22, 1917
Griffith, Wm. E., et ux.	Part E. ½ SE. ¼ sec. 31, T. 39 S., R. 10 E., W. M.	47.50	Oct. 11, 1916
Horalek, Charley, et ux.	Part SW. ¼ SE. ¼ sec. 15, T. 41 S., R. 12 E., W. M.	1.00	June 13, 1916
Hoyt, Hiram H., et ux.	Part SW. ¼ SE. ¼ sec. 4, T. 41 S., R. 11 E., W. M.	1.00	Apr. 13, 1917
Kamarad, J. F., et ux.	Part SW. ¼ SW. ¼ sec. 14, T. 41 S., R. 12 E., W. M.	1.00	June 13, 1916
Kelly, J. F. (unmarried).	Part SW. ¼ NE. ¼ sec. 23, T. 39 S., R. 9 E., W. M.	1.00	Apr. 18, 1917
Klamath Water Users' Association.	Part W. ½ NW. ¼ and SE. ¼ NW. ¼ sec. 15, T. 40 S., R. 9 E., W. M.	1,684.00	June 5, 1917
Krupka, Anton, et ex.	Part SE. ¼ NE. ¼ sec. 7, T. 41 S., R. 12 E., W. M.	1.00	June 22, 1917
Lakeside Co.	Part N. ½ SE. ¼, E. ½ SE. ¼ sec. 11, SE. ¼, and SE. ¼ SE. ¼ sec. 1, and NE. ¼ and NW. ¼ SE. ¼ sec. 12, all in T. 41 S., R. 11 E., W. M.	1.00	July 17, 1916
Lewis, C. C., et ux.	Part SE. ¼ SW. ¼ sec. 21, T. 39 S., R. 10 E., W. M.	1.00	June 28, 1915
Matney, John H., et ux.	Part S. ½ SE. ¼, SE. ¼ SW. ¼, and N. ½ SW. ¼ sec. 13, T. 40 S., R. 9 E., W. M.	1.00	May 18, 1917
Melhase, Gus, et al.	Part SE. ¼ NW. ¼ sec. 21, T. 39 S., R. 9 E., W. M.	1.00	July 29, 1916
Micka, Joseph, et ux.	Part SW. ¼ SE. ¼ and SE. ¼ SW. ¼ sec. 8, T. 41 S., R. 12 E., W. M.	1.00	June 22, 1917
Moore, Mary L. (widow).	Part E. ½ SE. ¼ and SE. ¼ SE. ¼ sec. 22; W. ½ SW. ¼ and SW. ¼ SW. ¼ sec. 23; NW. ¼ NW. ¼ sec. 26; NE. ¼ NE. ¼ sec. 27, and NE. ¼ NW. ¼ sec. 35, all in T. 39 S., R. 9 E., W. M.	1.00	Oct. 27, 1916
Otto, Armin, et ux.	Part SE. ¼ SE. ¼ sec. 34, T. 39 S., R. 9 E., W. M.	1.00	Apr. 12, 1917
Pope, Fred L., et ux.	Part NE. ¼ NE. ¼, NE. ¼ SE. ¼, and SE. ¼ SE. ¼ sec. 9, T. 41 S., R. 11 E., W. M.	1.00	July 19, 1916
Petrasek, Fred, et ux.	Part NW. ¼ SE. ¼ sec. 15, T. 41 S., R. 12 E., W. M.	1.00	June 13, 1916
Pope, Fred L., et ux.	Part SE. ¼ NE. ¼ sec. 9, T. 41 S., R. 11 E., W. M.	1.00	May 18, 1917
Quimby, estate of Eliza M., James W. Jory, administrator.	Part S. ½ SE. ¼ sec. 10, T. 40 S., R. 9 E., W. M.	600.00	May 26, 1917
Reynolds, H. R., et ux.	Part E. ½ SE. ¼ sec. 21, NE. ¼ NE. ¼ sec. 28, all in T. 39 S., R. 9 E., W. M.	1.00	Nov. 25, 1916
Schreiner, E. A., et ux.	Part SW. ¼ SW. ¼ sec. 2, T. 40 S., R. 9 E., W. M.	1.00	Apr. 23, 1917
Short, Burrell W., et ux.	Part SE. ¼ and SW. ¼ NE. ¼ sec. 13, T. 39 S., R. 9 E., W. M.	1.00	Sept. 23, 1916
Smith, Bertha E., et vir.	Part SE. ¼ SW. ¼ sec. 10, T. 40 S., R. 9 E., W. M.	498.00	June 2, 1917
Stejskal, Jacob, et ux.	Part NE. ¼ SE. ¼ sec. 7, T. 41 S., R. 12 E., W. M.	1.00	June 22, 1917

Purchases of rights and property—Continued.

OREGON-CALIFORNIA, KLAMATH PROJECT—Continued.

Vendor.	Description.	Consideration.	Date of deed.
Van Brimmer, Leafy (an unmarried lady).	Part SW. ¼ SW. ¼ and SE. ¼ SW. ¼ sec. 10, and lots 2 and 3, sec. 15, all in T. 41 S., R. 11 E., W. M.	$1.00	Aug. 15, 1916
Victorin, Joseph, et ux.....	Part SW. ¼ NE. ¼ sec. 16, T. 41 S., R. 12 E., W. M.	1.00	June 23, 1916
Walton, May, et vir.....	Part SE. ¼ SE. ¼ sec. 3, T. 39 S., R. 9 E., W. M.	128.00	Oct. 10, 1916
White, La Verne M., et vir.	Part NE. ¼ NW. ¼ and NW. ¼ NE. ¼ sec. 3, T. 39 S., R. 9 E., W. M.	1.00	July 13, 1916
	Improvements on above land.....	150.00	Do.

UTAH, STRAWBERRY VALLEY PROJECT.

Hansen, Elias, and wife....	NE. ¼ NE. ¼ sec. 5, T. 9 S., R. 3 E., S. L. B & M.	$1.00	Apr. 14, 1917
Johnson, Serena R., and husband.	NE. ¼ NE. ¼ sec. 6, T. 9 S., R. 3 E., S. L. B. & M.	50.00	Dec. 29, 1916

WASHINGTON, OKANOGAN PROJECT.

Pogue, J. I., et al.....	Right of way for canals and laterals	$450.00	Dec. 6, 1916

WASHINGTON, YAKIMA PROJECT, STORAGE UNIT.

Howson, S. H.....	N. ½ SW. ¼ NE. ¼ sec. 10, T. 20 N., R. 14 E., W. M.	$400.00	[1] Not yet issued.
Northern Pacific Railway Co. and Northwestern Improvement Co.	2,448.36 acres in T. 20 N., R. 14 E., W. M.; 21 N., R. 11, 12, 13, and 14; 22 N., R. 11 and 13 E., W. M.	33,825.92	June 15, 1917
Russell, John, and wife.....	158.65 acres in sec. 5, T. 13 N., R. 13 E., W. M.	17,500.00	Nov. 9, 1916

[1] Under contract of Sept. 19, 1916. Deed not yet issued because of flaw in title.

PRINCIPAL CURRENT CONTRACTS.

In the following tables are shown, by projects, data relative to the principal contracts in operation or completed during the fiscal year ending June 30, 1917:

Principal current contracts.

ARIZONA, SALT RIVER PROJECT.

No.	Date.	Contractor.	Description.	Estimated value.	Estimated earnings, June 30, 1917.	Completion due.
	Feb. 23, 1917	Allis-Chalmers Mfg. Co.	Switchboard panel....	$382.00	.....	105 days after order placed.
747	Jan. 26, 1917	El Paso Foundry & Machine Co.	3 needle valves for north outlet tunnel, Roosevelt.	39,570.00	.....	First valve, Sept. 1, 1917; second valve, Sept. 22, 1917; third valve, Oct. 13, 1917.
	Nov. 23, 1916	Fulton Engine Works.	Material for 38-inch needle valves.	960.00	$960.00	40 days after order placed.
	Mar. 20, 1917	General Electric Co.	Transformers.....	1,300.00	.....	100 days after order placed.

Principal current contracts—Continued.

ARIZONA, SALT RIVER PROJECT—Continued.

No.	Date.	Contractor.	Description.	Estimated value.	Estimated earnings, June 30, 1917.	Completion due.
747	Feb. 26, 1917	General Electric Co.	Motors, panels, and limit switches.	$515.00	.....	100 days after order placed.
	Feb. 5, 1917	.....do.....	Control panel and motors for 54-inch needle valves.	790.00	.....	180 days after drawings approved.
	Oct. 3, 1916	.....do.....	One 100-kilowatt motor generator exciter set and one voltage regulator.	3,425.00 600.00	.....	Shipment by June 30, 1917.
	Jan. 9, 1917	R. Hardesty Mfg. Co.	Culvert material.....	742.80	$742.80	June 15, 1917
	Apr. 19, 1917	Llewellyn Iron Works.	Outlet pipe, 38 inches by 8 feet 4 inches.	530.00	530.00	30 days after placing order.
732	Oct. 25, 1916	.....do.....	Cast-iron anchor pipes.	2,105.00	2,105.00	Dec. 13, 1916
	Feb. 7, 1917	Maloney Electric Co.	3 transformers.....	168.00	168.00	60 days after placing order.
	Apr. 20, 1917	Roy & Titcomb....	Steel gates, gate stems, and guide extensions.	410.00	.....	Do.
733	Nov. 1, 1916	S. Morgan Smith Co.	Turbine parts.....	9,000.00	9,000.00	Six months after approval of drawings.
	Feb. 17, 1917	Stearns-Roger Mfg. Co.	Pump and motor.....	246.79	246.79	140 days after placing order.
741	Dec. 18, 1916	Western Pipe & Steel Co.	Bronze inlet castings and 54-inch steel pipe-riveted.	900.00 7,838.00	8,755.50	Feb. 23, 1917

COLORADO, GRAND VALLEY PROJECT.

	June 27, 1916	Jess Palfreyman....	Earthwork, laterals, second lateral district, schedule 1.	$1,704.00	[1] $1,800.96	Oct. 1, 1916
	June 27, 1916	Dennis Palfreyman	Earthwork, laterals, second lateral district, schedule 2.	731.00	[1] 1,155.70	Do.
	Sept. 20, 1916	James O'Bryan....	Earthwork, Atchee wash channel change and canal embankment.	2,082.50	[1] 1,941.15	Nov. 25, 1916
	Sept. 29, 1916	Wm. Pollock.....	Earthwork, laterals, second and third lateral districts, schedule 1.	2,512.95	[1] 2,129.15	June 10, 1917
	Oct. 1, 1916	Starr, Kirkendall & Miles.	Earthwork, laterals, second and third lateral districts, schedule 2.	4,406.00	3,221.64	July 20, 1917
	Oct. 3, 1916	G. R. Maycock.....	Earthwork, laterals, second and third lateral districts, schedule 3.	4,446.40	[1] 4,097.60	June 1, 1917
	Oct. 9, 1916	J. M. Groesbeck....	Earthwork, laterals, second and third lateral districts, schedule 4.	5,394.00	[1] 5,607.50	June 15, 1917
	Oct. 3, 1916	J. J. Miller.....	Earthwork, laterals, second and third lateral districts, schedule 5.	4,616.00	[1] 4,911.70	June 1, 1917
	Mar. 14, 1917	Midland Bridge Co.	Furnishing 96-foot span steel bridge.	1,548.00	.....	July 6, 1917

[1] Completed.

Principal current contracts—Continued.

COLORADO, UNCOMPAHGRE VALLEY PROJECT.

No.	Date.	Contractor.	Description.	Estimated value.	Estimated earnings, June 30, 1917.	Completion due.
683	Mar. 16,1916	The Orman Construction Co.	Peach Valley lateral...	$9,626.79	[1] $10,611.51	July 19,1916
	July 5,1916	J. J. Halliday.....	Burbank ditch.....	979.00	[1] 1,026.93	Aug. 31,1916
	Oct. 14,1916	The Orman Construction Co.	Schedules 5 and 6, Buttermilk lateral.	2,456.25	[1] 2,113.25	Apr. 30,1917
	Oct. 16,1916	J. D. Brock and F. E. Wiggins.	Schedules 3 and 4, Buttermilk lateral.	1,635.00	[1] 1,093.26	June 29,1917
	Oct. 24,1916	Halliday & Elledge.	Schedule 2, Buttermilk lateral.	2,841.00	[1] 2,082.84	Mar. 1,1917
	Nov. 3,1916	The Orman Construction Co.	Schedule 1, Buttermilk lateral.	2,396.00	[1] 2,182.17	Mar. 1,1917

MONTANA, FLATHEAD (INDIAN) PROJECT.

F-3	May 29,1916	Earl D. Covell.....	Earthwork, Pablo division, North Pablo By-Pass Canal.	$3,725.60	[1] $3,735.60	July 5,1916
711	June 23,1916	Mendenhall, Bird & Co.	Earthwork, Pablo division, 70A and 71A sublaterals.	29,500.00	[1] 29,154.66	Dec. 15,1916
710	July 3,1916	C. B. Long.....	Structures on laterals, 31A06, 31A07, and 31A1, Pablo division.	14,948.30	[1] 13,186.83	Dec. 19,1916
717	July 24,1916	Percy M. Ross.....	Earthwork, Pablo division 31A and sublaterals.	18,040.00	[1] 19,847.72	Dec. 15,1916
6745	Oct. 23,1916	Pacific Tank & Pipe Co.	Wood-stave pipe and erection, Post F, lateral, post division.	1,488.88	[1] 1,488.88	30 days after order.
731	Oct. 19,1916	Pearson Construction Co.	Earthwork and structures, Pablo laterals 43A and 50A, and sublaterals.	38,236.50	33,324.66	June 15,1917
738	Dec. 1,1916	Mendenhall, Bird & Co.	Earthwork, Post 30MA sublaterals.	44,541.00	32,330.43	June 30,1917
739	Nov. 27,1916	Welch Bros. & Hannaman.	Structures 30MA and sublaterals, schedule 4, specification 350.	17,255.80	11,297.68	May 24,1917
688	Apr. 10,1916	Vulcan Iron Works.	Steel gates.....	6,350.50	5,975.52	Aug. 2,1916
693	Apr. 20,1916	Percy M. Ross.....	Earthwork and structures, Mission, Post, and Pablo divisions.	13,955.00	[1] 15,892.20	Sept. 30,1916
695	May 8,1916	C. B. Long.....	Earthwork and structures, Jocko division laterals E, J, L, M, N, and R.	9,385.00	[1] 10,443.39	Do.

MONTANA, MILK RIVER PROJECT.

656	Oct. 21,1915	Snelson Bros.....	Earthwork, Nelson Reservoir South Canal.	$7,490.00	[1] $7,402.05	July 15,1916
658	Nov. 1,1915	Jurgens, Booth & Co.	Earthwork and structures, Bowdoin Canal.	17,756.00	[1] 17,990.03	June 30,1916
659	Oct. 29,1915	James O'Connor....	Earthwork, Bowdoin Canal.	18,618.50	[1] 18,449.35	July 10,1916
660	Nov. 1,1915	Jurgens, Booth & Co.	Structures, Nelson Reservoir South Canal.	34,081.50	[1] 29,510.17	Oct. 10,1916
662	Nov. 6,1915	Lakeside Bridge & Steel Co.	Bridge and movable crest gates, Vandalia diversion dam.	16,368.75	14,141.86	[2]
664	Nov. 19,1915	.....do.....	Hoisting machinery and operating equipment, Vandalia diversion dam.	16,301.00	10,273.84	Sept. 15,1916
692	Apr. 19,1916	L. W. Dotson.....	Earthwork, Bowdoin Canal system.	9,105.95	[1] 7,879.64	July 30,1916

[1] Completed.
[2] Schedule 1, Aug. 12, 1916; schedule 2, Apr. 30, 1916; schedule 3, conditional on date of complete arrival of material at site.

Principal current contracts—Continued.

MONTANA, MILK RIVER PROJECT—Continued.

No.	Date.	Contractor.	Description.	Estimated value.	Estimated earnings, June 30, 1917.	Completion due.
694	May 15,1916	The Security Bridge Co.	Structures, Bowdoin Canal system.	$12,940.00	[2] $12,279.71	Oct. 31,1916
696	May 26,1916	Vulcan Iron Works Co.	Gates and stands.....	4,928.00	[2] 4,886.99	Oct. 1,1916
701	May 29,1916	Joshua Hendy Iron Works.	.....do.....	1,170.00	[2] 1,170.00	July 25,1916
702	June 13,1916	Lakeside Bridge & Steel Co.	.....do.....	1,022.00	[2] 1,022.00	Aug. 16,1916
(1)	June 24,1916	K. O. Merrifield.....	Telephone line.....	1,399.00	[2] 1,465.13	Sept. 20,1916
714	July 22,1916	The Security Bridge Co.	Structures, Bowdoin laterals.	7,847.50	7,153.69	July 31,1917
720	Aug. 15,1916	James O'Connor and John T. Whalen.	Earthwork, Bowdoin laterals.	21,743.00	[2] 20,052.93	May 31,1917
723	Sept. 5,1916	O'Connor & Whalen	Earthwork, Nelson Reservoir South laterals.	108,352.50	63,765.68	Oct. 30,1917
734	Oct. 23,1916	Booth & Knipe....	Structures, Nelson Reservoir South laterals.	28,384.50	8,463.48	Oct. 31,1917
763	June 7,1917	Rolla Barnes.....	Excavation and earth-lining, Nelson Reservoir South Canal.	5,344.00	.....	Sept. 11,1917

MONTANA, MILK RIVER PROJECT, ST. MARY STORAGE UNIT.

721	Aug. 9,1916	Milwaukee Bridge Co.	Stationary parts for movable crest spillway, Sherburne Lakes Dam.	$950.00	$971.89	Nov. 1,1916
719	Aug. 10,1916	J. & J. B. Milholland.	.....do.....	2,118.00	1,980.90	Nov. 18,1916
	Jan. 8,1917	East St. Louis Bridge Co.	Riveted steel highway bridge at Sherburne Lakes Dam.	2,161.00	.....	[3]

MONTANA, SUN RIVER PROJECT.

	Feb. 19,1913	Great Falls Power Co.	Electrical energy.....	$60,000.00	$20,606.38	Sept. 29,1919
649	Sept. 2,1915	West Coast Construction Co. and Hans Pederson.	Structures, Greenfields distribution system.	[4] 65,976.30	[4] 17,214.55	July 26,1916
699	June 10,1916	Pacific Tank & Pipe Co.	Wood stave pipe.....	7,817.50	[2] 7,839.33	Dec. 9,1916
	Oct. 16,1916	C. J. Erickson and Wm. Fransen.	Completion of suspended contract No. 649, with West Coast Construction Co. and Hans Pederson.	48,761.75	6,460.55	June 30,1917
	June 4,1917	R. Hardesty Mfg. Co.	Lateral turnout gates..	3,396.98	.....	Nov. 8,1917
	Apr. 20,1917	I. J. Denton.....	Spillway channel and addition to dam at Willow Creek Reservoir.	1,287.50	993.07	July 14,1917
650	Aug. 30,1915	Threet Bros. & Jolley.	Highway bridges, Greenfields distribution system.	7,517.50	[1] 9,271.29	July 24,1916
654	Sept. 18,1915	J. E. Hilton.....	Laterals, Greenfields distribution system.	46,523.00	[1] 51,464.07	Sept. 2,1916
682	Feb. 21,1916	Des Moines Bridge & Iron Co.	Steel highway and pipe bridge.	9,000.00	[1] 8,880.00	Oct. 16,1916

[1] Awarded and executed in project office.
[2] Completed.
[3] Material to be delivered at factory by June 1, 1917. Erection to be completed within 50 days of receipt of notice to begin work.
[4] Suspended Sept. 18, 1916.

Principal current contracts—Continued.

NEW MEXICO-TEXAS, RIO GRANDE PROJECT.

No.	Date.	Contractor.	Description.	Estimated value.	Estimated earnings, June 30, 1917.	Completion due.
744	Jan. 3, 1917	Lee Moor Contracting Co.	Arrey Canal excavation.	$39,931.20	[1] $38,552.47	Apr. 20, 1917
	Mar. 12, 1917	.....do.....	Levee, Percha Dam...	2,485.50	[1] 2,180.25	June 1, 1917
750	Feb. 27, 1917	Wisconsin Bridge & Iron Co.	Bridge for Garfield flume.	16,700.00	16,700.00	June 4, 1917
751	Mar. 6, 1917	R. Hardesty Mfg. Co.	Flume material, Garfield flume.	6,830.79	6,830.79	July 1, 1917
	.....	Bucyrus Co.....	4 drag-line excavators.	60,000.00	45,000.00	July 29, 1917
762	Apr. 17, 1917	.....do.....	.....do.....	70,400.00	None.	Mar. 20, 1918

NEBRASKA-WYOMING, NORTH PLATTE PROJECT.

745	Jan. 5, 1917	Monighan Machine Co.	Drag-line excavator...	$8,071.00	[1] $8,283.38	Jan. 10, 1917

WASHINGTON, YAKIMA PROJECT, STORAGE UNIT.

	Mar. 8, 1917	The Prest-O-Lite Co.	Acetylene.....	$225.00	$19.89	Dec. 31, 1917
	.....do.....	The Linde Air Products Co.	Furnishing oxygen....	225.00	27.00	Do.
	June 20, 1917	Pacific Coast Pipe Co.	Wood stave pipe.....	1,800.00	1,200.00	July 5, 1917
	May 12, 1917	.....do.....	.....do.....	1,837.58	1,837.58	May 23, 1917
	June 28, 1917	W. J. Parmentier...	Gravel.....	100.00	100.00	June 28, 1922
	June 18, 1917	Wm. Gnavauch....	.....do.....	500.00	500.00	June 18, 1922
	Jan. 16, 1917	N. P. Ry. Co.... ..	Lease warehouse, Naches, Wash.	[1] 17.50	8.75	Apr. 28, 1922
	Jan. 20, 1917	Harry Painter.....	.....do.....	180.00	[2]	Mar. 9, 1920
	Apr. 10, 1917	Yakima Co.....	Improvement Tieton canyon roads.	150.00	150.00	
	June 10, 1917	.....do.....	.....do.....	500.00	500.00	
	Apr. 2, 1917	St. Elizabeths Hospital.	Hospital service.....	4,000.00	20.55	Apr. 2, 1922
	Jan. 13, 1917	R. H. White.....	Use of patent choker for logging purposes.	2,000.00	.....	Jan. 1, 1922

[1] Per annum. [2] Rent.

CEMENT.

Tabulation of cement tests from

[Average of accepted cement.]

Brand.	Quantity (barrels).	Fineness.		Setting time.		Specific gravity.	Composition of briquets.	Tensile strength.			
								1 day.		7 days.	
		Per cent passing No. 100 sieve.	Per cent passing No. 200 sieve.	Initial.	Final.			Number of briquets.	Pounds per square inch.	Number of briquets.	Pounds per square inch.
				H. m.	*H. m.*						
Ash Grove	30,850	95.6	82.2	3 51	7 25	3.16	Neat	30	361	655	766
							3 to 1			655	348
Atlas (Hannibal, Mo.)	17,690	96.2	78.2	1 45	5 02	3.17	Neat	30	353	385	603
							3 to 1			385	235
Concrete	22,586	98.3	83.3	3 49	6 31	3.14	Neat	40	373	566	727
							3 to 1			566	359
Cowboy	21,395	96.2	76.6	3 09	6 20	3.15	Neat	40	314	712	749
							3 to 1			712	279
Dewey	14,206	96.6	80.1	3 45	6 40	3.15	Neat	15	407	225	728
							3 to 1			225	323
El Toro	350,813	93.4	77.5	2 50	5 33	3.16	Neat	375	357	5,358	694
							3 to 1			5,358	261
Golden Gate	246,053	96.0	78.4	3 25	5 55	3.12	Neat	120	319	7,644	655
							3 to 1			7,644	217
Ideal	267,362	96.5	80.6	3 44	7 07	3.14	Neat	125	384	4,818	687
							3 to 1			4,818	305
Inland, Lehigh (Metaline Falls, Wash.)[1]	61,568	95.5	79.1	3 23	5 38	3.14	Neat	40	356	1,539	704
							3 to 1			1,539	316
Iola	182,272	94.2	78.4	3 53	7 49	3.16	Neat	135	370	3,607	767
							3 to 1			3,607	314
Lehigh (Mason City, Iowa)	15,335	95.8	79.1	3 35	5 58	3.17	Neat	25	375	404	693
							3 to 1			404	299
Marquette	32,155	94.7	77.3	3 18	7 05	3.15	Neat	35	384	635	724
							3 to 1			635	296
Mount Diablo	43,740	95.0	78.8	3 40	6 22	3.13	Neat	30	386	433	668
							3 to 1			433	240
Ogden	233,439	97.1	79.2	4 06	7 20	3.16	Neat	90	287	4,279	646
							3 to 1			4,279	283
Red Devil (Devil's Slide, Utah)	303,611	96.5	78.4	3 45	6 26	3.14	Neat	110	363	5,342	733
							3 to 1			5,342	333
Red Devil Trident, Mont.)	115,880	97.7	83.4	3 36	6 12	3.14	Neat	95	328	2,775	665
							3 to 1			2,775	335
Red Diamond, Utah[2]	54,559	96.9	79.7	4 13	7 40	3.15	Neat	80	352	2,365	639
							3 to 1			2,365	317
Riverside	38,350	96.3	80.3	4 32	7 33	3.13	Neat	45	371	909	707
							3 to 1			909	323
Spokane	26,500	95.5	80.3	3 13	5 55	3.11	Neat	20	355	568	791
							3 to 1			568	361
Standard (Napa Junction, Cal.)	43,691	97.2	82.2	4 07	6 58	3.11	Neat	45	265	692	656
							3 to 1			692	251
Sunflower (Independence, Kans.)	7,055	95.8	79.1	2 32	6 32	3.17	Neat	15	422	133	880
							3 to 1			133	379
Sunflower (Iola, Kans.)	87,975	94.2	78.0	3 30	7 24	3.15	Neat	55	347	1,242	783
							3 to 1			1,242	278
Universal (South Chicago, Ill.)	184,100	96.9	81.0	3 24	7 26	3.14	Neat	70	343	3,635	659
							3 to 1			3,635	263
Yankton	28,484	96.3	80.4	3 53	8 28	3.21	Neat	85	261	945	644
							3 to 1			945	252
Total and average	2,429,669	95.8	79.2	3 35	6 41	3.14	Neat	1,750	346	49,866	691
							3 to 1			49,866	286

[1] Made at same plant. Brand name changed from Inland to Lehigh, April, 1914.
[2] Made at same plant. Brand name changed from Red Diamond to Utah, June, 1910.

CEMENT

January 1, 1904, to June 30, 1917.

[Average of accepted cement.]

Tensile strength.																	
28 days.		3 months.		6 months.		1 year.		2 years.		3 years.		5 years.		7½ years.		10 years.	
Number of briquets.	Pounds per square inch.	Number of briquets.	Pounds per square inch.	Number of briquets.	Pounds per square inch.	Number of briquets.	Pounds per square inch.	Number of briquets.	Pounds per square inch.	Number of briquets.	Pounds per square inch.	Number of briquets.	Pounds per square inch.	Number of briquets.	Pounds per square inch.	Number of briquets.	Pounds per square inch.
655	797	40	770	40	757	40	732	40	759	40	750	30	737	10	679	.....	.....
655	452	40	470	40	459	40	439	40	439	40	432	30	450	10	399	.....	.....
385	667	30	705	30	670	30	689	30	739	30	692	30	690	5	681	.....	.....
385	358	30	467	30	437	30	439	30	413	30	405	30	416	5	404	.....	.....
566	762	40	810	40	766	30	759	30	695	20	661	15	671	10	563	.....	.....
566	446	40	472	40	472	30	466	30	445	20	413	15	409	10	400	.....	.....
712	871	40	846	40	843	40	808	40	781	30	735	30	727	25	695	15	776
712	396	40	443	40	448	40	441	40	431	30	419	30	427	25	437	15	429
225	787	15	769	15	831	15	788	15	753	10	730	5	754	5	729	.....	.....
225	417	15	450	15	469	15	457	15	418	10	409	5	427	5	461	.....	.....
5,356	799	445	713	310	824	195	836	105	806	70	796	45	788	.....	.....	.....	.....
5,356	347	445	350	310	427	195	431	105	435	70	433	45	444	.....	.....	.....	.....
6,278	788	255	760	110	708	90	694	95	680	80	693	60	644	15	684	.....	.....
6,278	343	255	437	110	428	90	407	95	415	80	415	60	429	15	396	.....	.....
4,822	736	130	729	125	722	120	702	120	705	115	695	95	663	75	671	40	667
4,822	406	130	448	125	457	120	465	120	452	115	435	95	427	75	427	40	396
1,539	760	40	808	40	786	40	796	15	771	15	724	.....	.....	.....	.....	.....	.....
1,539	434	40	461	40	444	40	449	15	351	15	361	.....	.....	.....	.....	.....	.....
3,607	837	145	841	140	793	135	791	125	774	120	754	115	723	90	734	45	713
3,607	431	145	456	140	453	135	423	125	413	120	390	115	403	90	398	45	380
404	758	25	757	25	751	25	775	25	798	20	716	5	704	.....	.....	.....	.....
404	433	25	459	25	446	25	436	25	413	20	402	5	447	.....	.....	.....	.....
635	822	35	755	35	737	35	724	35	749	35	701	35	706	25	714	.....	.....
635	402	35	441	35	447	35	446	35	459	35	437	35	434	25	436	.....	.....
433	738	35	759	30	721	30	707	30	693	30	715	25	711	5	698	.....	.....
433	341	35	414	30	431	30	414	30	406	30	410	25	407	5	334	.....	.....
4,279	725	90	756	90	747	85	754	75	741	45	732	10	642	.....	.....	.....	.....
4,279	401	90	446	90	455	85	455	75	448	45	408	10	474	.....	.....	.....	.....
5,342	757	120	792	120	782	105	782	95	777	70	761	45	760	15	801	.....	.....
5,342	433	120	455	120	456	105	432	95	410	70	405	45	389	15	423	.....	.....
2,775	718	95	728	90	714	80	691	60	698	45	640	20	650	.....	.....	.....	.....
2,775	457	95	485	90	474	80	471	60	460	45	437	20	456	.....	.....	.....	.....
2,370	711	95	722	95	751	90	759	90	761	80	744	70	718	40	695	40	681
2,370	418	95	469	95	486	90	481	90	448	80	424	70	408	40	412	40	402
909	746	45	757	40	752	25	754	25	746	15	742	10	716	.....	.....	.....	.....
909	416	45	460	40	473	25	444	25	428	15	402	10	427	.....	.....	.....	.....
568	826	25	766	25	745	25	753	20	719	5	700	.....	.....	.....	.....	.....	.....
568	441	25	446	25	430	25	428	20	371	5	372	.....	.....	.....	.....	.....	.....
713	756	50	732	40	736	40	770	40	710	20	687	10	608	10	636	.....	.....
713	357	50	478	40	494	40	521	40	520	20	485	10	481	10	553	.....	.....
133	927	15	925	15	881	15	824	15	803	15	739	15	782	10	819	5	708
133	504	15	496	15	504	15	470	15	467	15	445	15	450	10	421	5	383
1,242	874	55	820	55	807	55	765	55	755	55	744	55	714	45	752	15	679
1,242	424	55	434	55	424	55	387	55	367	55	373	55	371	45	377	15	351
3,635	803	70	860	70	817	70	799	70	781	70	751	70	745	70	738	45	745
3,635	375	70	420	70	407	70	402	70	372	70	346	70	351	70	356	45	335
945	775	60	791	60	785	60	773	60	748	60	768	60	732	60	759	20	627
945	357	60	433	60	440	60	430	60	414	60	420	60	412	60	409	20	417
48,528	777	1,995	762	1,680	772	1,475	763	1,315	747	1,095	730	855	712	515	719	225	700
48,528	398	1,995	429	1,680	448	1,475	440	1,315	427	1,095	411	855	413	515	405	225	383

NOTE.—In considering the results of long-time tests, as shown above, it should be borne in mind that while the results for the different periods are approximately comparable, they are not directly comparable, as in most cases there is a difference in the number of briquets represented by the results for various periods on the different brands, owing to the fact that new sets are being started from time to time, the results of which become available at different periods.

UNIT BIDS AND CONTRACT PRICES.

Unit bids and contract prices on formal specifications.

BACK FILLING.

State and project.	Date opening bids.	Specification No.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Montana, Flathead (Indian)	July 18, 1916	333	Pablo laterals 70A and 71A, reissue schedule 4, dry.	Cubic yard	3,360	$0.60		Rejected.
Do	do	333	Pablo laterals 70A and 71A, reissue schedule 4, puddled.	do	1,250	.90		Rejected.
Do	Sept. 20, 1916	344	Pablo lateral 43A, schedule 2, dry	do	650	.20	$0.35	$0.35
Do	do	344	Pablo lateral 43A, schedule 2, puddled	do	320	.40	.50	.40
Do	do	344	Pablo lateral 50A, schedule 4, dry	do	2,000	.20	.35	.35
Do	do	344	Pablo lateral 50A, schedule 4, puddled	do	1,000	.40	.50	.40
Do	Oct. 10, 1916	350	Post 30MA sublaterals, dry	do	2,850	.25	.35	.25
Do	do	350	Post 30MA sublaterals, puddled	do	800	.50	.60	.60
Montana, Milk River	June 22, 1916	340	Bowdoin Canal system, schedule 2, structures.	do	2,000	.25		.25
Do	Sept. 27, 1916	347	Nelson Reservoir South Canal system, structures.	do	7,000	.40	.60	.40
Montana, Sun River	Mar. 29, 1917	358	Greenfields division, first unit, schedule 1	do	750	.25	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2	do	750	.25	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3	do	770	.25	(1)	Rejected.
New Mexico-Texas, Rio Grande	Jan. 18, 1917	53-D	Rio Grande Crossing, Picacho flume	do	500	.40	(1)	Rejected.
Do	do	53-D	Rio Grande Crossing, Garfield flume	do	1,500	.84	(1)	Rejected.
Wyoming, Shoshone	Sept. 27, 1916	331	Frannie division, first unit, structures, schedule 1.	do	1,200	.225	(1)	.225
Do	do	331	Frannie division, first unit, structures, schedule 2.	do	1,000	.225	(1)	.225
Do	Apr. 24, 1917	331	Frannie division, first unit, structures	do	200	.25	(1)	.25
Do	May 1, 1917	364	Garland division, lateral 67F, structures	do	1,000	.40	(1)	.40

BACK FILLING PUDDLED.

Montana, Milk River	June 22, 1916	340	Bowdoin Canal system, schedule 2, structures.	Cubic yard	200	$0.75		$0.75
Do	Sept. 27, 1916	347	Nelson Reservoir South Canal system, structures.	do	1,400	.65	$0.75	.65
Montana Sun River	Mar. 29, 1917	358	Greenfields division, first unit, schedule 1	do	700	.60	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2	do	560	.60	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3	do	650	.60	(1)	Rejected.

Wyoming, Shoshone	Sept. 27, 1916	331	Frannie division, first unit, structures, schedule 1.	do	500	.675	(1)	.675
Do	do	331	Frannie division, first unit, structures, schedule 2.	do	500	.675	(1)	.675
Do	Apr. 24, 1917	331	Frannie division, first unit, structures, schedule 3.	do	200	.75	(1)	.75
Do	May 1, 1917	364	Garland division, lateral 67F, structures	do	200	1.00	(1)	1.00

BRIDGE STEEL.

Colorado, Grand Valley	Mar. 6, 1917	65-D	196-foot span, East Salt Creek siphon	Each	1	$1,548	$1,700	$1,548
Montana, Milk River, St. Mary storage	Dec. 29, 1916	F-13	Four steel pony truss bridges 41 feet 6 inches each.	Lump sum				1,461
Do	do	F-13	Item 1 of schedule, materials					
Do	do	F-13	Item 2 of schedule, erecting	do				700

CANAL LINING CONCRETE.

Montana, Flathead (Indian)	Sept. 20, 1916	344	Pablo lateral 43A, 4-inch lining	Square feet	6,850	$0.10	$0.25	$0.10
Do	do	344	Pablo lateral 43A, 2-inch lining	do	3,250	.08	.18	.08

CONCRETE.

Montana, Flathead (Indian)	July 18, 1916	333	Pablo laterals 70A and 71A, reissue, schedule 4.	Cubic yard	600	$26.20		Rejected.
Do	Sept. 20, 1916	344	Pablo lateral 43A, schedule 2	do	97	8.00	$21.00	$8.00
Do	do	344	Pablo laterals 50A, schedule 4	do	400	8.00	21.00	8.00
Do	Oct. 10, 1916	344	Post 30MA, sublaterals	do	425	17.50	19.00	24.00
Montana, Milk River	June 22, 1916	340	Bowdoin Canal system, schedule 2, structures	do	220	14.50		14.50
Do	Sept. 27, 1916	347	Nelson Reservoir South Canal system, structures.	do	600	14.25	15.00	14.25
Montana, Sun River	Mar. 29, 1917	358	Greenfields division, first unit, schedule 1	do	160	22.00	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2	do	140	22.00	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3	do	180	22.00	(1)	Rejected.
New Mexico-Texas, Rio Grande	Jan. 18, 1917	53-D	Rio Grande Crossing, Picacho flume	do	177	24.87	(1)	Rejected.
Do	do	53-D	Rio Grande crossing, Garfield flume	do	900	28.00	(1)	Rejected.
Wyoming, Shoshone	Sept. 27, 1916	331	Frannie division, first unit, structures, schedule 1.	do	350	11.30	(1)	11.30
Do	do	331	Frannie division, first unit, structures, schedule 2.	do	260	11.30	(1)	11.30
Do	Apr. 24, 1917	331	Frannie division, first unit, structures, schedule 2.	do	130	8.50	(1)	8.50
Do	May 1, 1917	364	Garland division, lateral 67F, structures	do	57	15.00	(1)	15.00

[1] Only one bid.

Unit bids and contract prices on formal specifications—Continued.

CULVERTS, CORRUGATED METAL.

State and project.	Date opening bids.	Specification No.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Montana, Sun River	Apr. 17, 1917	76–D	Greenfields division, first unit, 18 inches diameter, 26 feet long.	Each	10	$29.12	$31.00	$29.12
Do	do	76–D	Greenfields division, first unit, 20 inches diameter, 18 feet long.	do	6	21.96	25.00	21.96
Do	do	76–D	Greenfields division, first unit, 24 inches diameter, 14 feet long.	do	1	21.25	22.00	21.25
Do	do	76–D	Greenfields division, first unit, 24 inches diameter, 28 feet long.	do	5	42.56	44.00	42.56
Do	do	76–D	Greenfields division, first unit, 30 inches diameter, 18 feet long.	do	7	39.78	41.00	39.78
Do	do	76–D	Greenfields division, first unit, 30 inches diameter, 28 feet long.	do	4	61.38	64.00	61.38
Do	do	76–D	Greenfields division, first unit, 36 inches diameter, 18 feet long.	do	1	47.16	49.00	47.16
Do	do	76–D	Greenfields division, first unit, 42 inches diameter, 18 feet long.	do	1	55.80	58.00	55.80

EARTH LINING.

Montana, Milk River	Apr. 25, 1917	363	Nelson Reservoir, south	Cubic yard	7,500	$0.49	$1.25	$0.49

EARTHWORK.

Montana, Huntley	Apr. 27, 1917	Informal.	Earthwork, class 1, auxiliary canal, F. G. L.	Cubic yard	19,300	$0.45	(1)	Rejected.
Wyoming, Shoshone	Aug. 18, 1916	342	Frannie division, second unit, schedule 1, item 1.	do	106,000	.15	$0.15	$0.15
Do	do	342	Frannie division, sceond unit, schedule 1, item 2.	do	9,000	.30	.33	.40
Do	do	342	Frannie division, second unit, schedule 1, item 3.	do	7,000	.70	.75	.80
Do	do	342	Frannie division, second unit, schedule 1, item 4.	do	20,000	.02	.02	.02
Do	do	342	Frannie division, second unit, schedule 2, item 5.	do	57,000	.139	.14	.15

Do	do	342	Frannie division, second unit, schedule 2, item 6.	do	4,500	.30	.39	.40
Do	do	342	Frannie division, second unit, schedule 2, item 7.	do	6,500	.45	.70	.80
Do	do	342	Frannie division, second unit, schedule 3, item 8.	do	10,000	.02	.02	.02
Do	do	342	Frannie division, second unit, schedule 3, item 9.	do	161,000	.14	.154	.14
Do	do	342	Frannie division, second unit, schedule 3, item 10.	do	10,000	.20	.30	.40
Do	do	342	Frannie division, second unit, schedule 3, item 11.	do	5,000	.50	.70	.80
Do	do	342	Frannie division, second unit, schedule 3, item 12.	do	20,000	.02	.02	.02
Do	do	342	Frannie division, second unit, schedule 4, item 13.	do	178,000	.15	.1525	.15
Do	do	342	Frannie division, second unit, schedule 4, item 14.	do	20,000	.29	.30	.40
Do	do	342	Frannie division, second unit, schedule 4, item 15.	do	8,000	.65	.70	.80
Do	do	342	Frannie division, second unit, schedule 4, item 16.	do	20,000	.02	.02	.02
Do	Mar. 15, 1917	356	Frannie division, second unit, schedule 1, item 1.	do	18,000	.15	.155	.155
Do	do	356	Frannie division, second unit, schedule 1, item 2.	do	2,000	.45	.50	.78
Do	do	356	Frannie division, second unit, schedule 1, item 3.	do	4,000	.75	.78	.78
Do	do	356	Frannie division, second unit, schedule 1, item 4.	do	10,000	.02	.02	.02
Do	do	356	Frannie division, second unit, schedule 2, item 5.	do	54,000	.125	.14	.125
Do	do	356	Frannie division, second unit, schedule 2, item 6.	do	2,200	.16	.40	.40
Do	do	356	Frannie division, second unit, schedule 2, item 7.	do	3,600	.16	.60	.80
Do	do	356	Frannie division, second unit, schedule 2, item 8.	do	5,000	.02	.02	.02
Do	do	356	Frannie division, second unit, schedule 3, item 9.	do	56,000	.15	.155	.15
Do	do	356	Frannie division, second unit, schedule 3, item 10.	do	3,500	.45	.60	.80
Do	do	356	Frannie division, second unit, schedule 3, item 11.	do	10,500	.80	.80	.80
Do	do	356	Frannie division, second unit, schedule 3, item 12.	do	5,000	.02	.02	.02
Do	do	356	Frannie division, second unit, schedule 4, item 13.	do	70,000	.125	.14	.125
Do	do	356	Frannie division, second unit, schedule 4, item 14.	do	500	.14	.17	.40

[1] Only one bid.

Unit bids and contract prices on formal specifications—Continued.

EARTHWORK—Continued.

State and project.	Date opening bids.	Specification No.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Wyoming, Shoshone	Mar. 15, 1917	356	Frannie division, second unit, schedule 4, item 15.	Cubic yard	500	$0.14	$0.17	$0.78
Do	do	356	Frannie division, second unit, schedule 4, item 16.	do	5,000	.02	.02	.02
Do	Apr. 18, 1917	362	Frannie division, second unit, schedule 1, item 1.	do	25,000	.149	.15	.149
Do	do	362	Frannie division, second unit, schedule 1, item 2.	do	1,000	.60	.80	.80
Do	do	362	Frannie division, second unit, schedule 1, item 3.	do	4,000	.60	.80	.80
Do	do	362	Frannie division, second unit, schedule 1, item 4.	do	4,000	.02	.02	.02

EXCAVATION, CLASS 1.

Colorado, Grand Valley	Sept. 14, 1916	345	Laterals, second and third districts, schedule 1.	Cubic yards	14,270	$0.135	$0.14	$0.135
Do	do	345	Laterals, second and third districts, schedule 2.	do	22,300	.14	.15	.14
Do	do	345	Laterals, second and third districts, schedule 3.	do	30,780	.13	.15	.13
Do	do	345	Laterals, second and third districts, schedule 4.	do	30,660	.15	.25	.15
Do	do	345	Laterals, second and third districts, schedule 5.	do	26,040	.15	.25	.15
Colorado, Uncompahgre Valley	Jan. 18, 1916	323	Peach Valley lateral, schedule 1	do	8,000	.15	.17¼	.17¼
Do	do	323	Peach Valley lateral, schedule 2	do	7,000	.15	.1599	.1599
Do	do	323	Peach Valley lateral, schedule 3	do	6,300	.15	.1599	.1599
Do	do	323	Peach Valley lateral, schedule 4	do	5,900	.15	.17½	.18½
Do	do	323	Peach Valley lateral, schedule 5	do	5,700	.15	.1599	.1599
Do	do	323	Peach Valley lateral, schedule 6	do	6,800	.15	.1599	.1599
Do	do	323	Peach Valley lateral, schedule 7	do	5,500	.15	.17½	.17½
Do	June 26, 1916		Burbank ditch	do	6,350	.15	.17	.15
Do	Oct. 16, 1916		Buttermilk lateral, schedule 1	do	6,900	.31½	.33	.33
Do	do		Buttermilk lateral, schedule 2	do	9,650	.27	.27¾	.27
Do	Oct. 9, 1916		Buttermilk lateral, schedule 3	do	5,350	.14½	.1499	.14½

Do	do		Buttermilk lateral, schedule 4	do	5,200	.14½	.1499	.14½
Do	do		Buttermilk lateral, schedule 5	do	5,500	.15½	.16	.15½
Do	do		Buttermilk lateral, schedule 6	do	8,000	.17¼	.16½	.17¼
Montana, Flathead (Indian)	Sept. 20, 1916	344	Pablo lateral, 43A, schedule 1	do	8,000	.19	.22	.19
Do	do	344	Pablo lateral, 50A, schedule 3	do	108,000	.19	.19½	.19
Do	Oct. 10, 1916	350	Mission C lateral	do	79,000	.17	.20	.20
Do	do	350	Post F lateral	do	77,000	.17	.19	.19
Do	do	350	Post 30MA sublaterals	do	53,000	.17	.21½	.23
Do	Nov. 28, 1916	352	Camas A Canal, schedule 1	do	40,000	.40	.42	Rejected.
Do	do	352	Camas A Canal, schedule 2	do	35,000	.25	.29	Rejected.
Do	do	352	Camas A Canal, schedule 3	do	26,000	.25½	.32	Rejected.
Do	do	352	Camas A Canal, schedule 4	do	79,000	.23	.24½	Rejected.
Do	Apr. 5, 1917	359	Camas lateral B, schedule 1	do	81,000	.19	.21	.19
Do	do	359	Camas lateral C to station 570, schedule 2	do	72,000	.19	.21	.19
Do	do	359	Camas lateral C below station 570, schedule 3	do	54,000	.19	.21	.19
Do	do	359	Camas lateral D, schedule 4	do	28,500	.19	.21	.19
Do	do	359	Post A extension, schedule 5	do	23,000	.20½	.32	.20½
Do	do	359	Post C extension, schedule 6	do	15,000	.20½	.22	.20½
Montana, Milk River	June 22, 1916	340	Bowdoin Canal system, schedule 1	do	130,000	.167		.167
Do	Aug. 14, 1916	341	Nelson Reservoir, South Canal system, schedule 1.	do	280,000	.162		.162
Do	do	341	Nelson Reservoir, South Canal system, schedule 2.	do	225,000	.176		.176
Do	do	341	Nelson Reservoir, South Canal system, schedule 3.	do	110,000	.195		.195
Do	Apr. 25, 1917	363	Nelson Reservoir, South Canal	do	7,500	.49	.75	.49
Montana, Sun River	Mar. 29, 1917	358	Greenfields division, first unit, schedule 1, lateral.	do	11,500	.18	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2, lateral.	do	19,000	.18	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3, lateral.	do	14,500	.18	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 1, drain.	do	3,100	.30	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2, drain.	do	5,600	.30	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3, drain.	do	3,700	.30	(1)	Rejected.
Do	Apr. 20, 1917	358	Greenfields division, refill of highway crossings.	do	1,750	.25	(1)	.25
Do	do	358	Willow Creek Reservoir, spillway channel	do	3,000	.22	(1)	.22
Do	do	358	Willow Creek Reservoir, excavation for dam	do	700	.65	(1)	.65
Do	do	358	Willow Creek Reservoir, excavation for dam, gravel surfacing.	do	80	1.40	(1)	1.40
New Mexico-Texas, Rio Grande	Nov. 24, 1916	353	Arrey Canal, schedules 1 to 7	Cubic yard	158,000	[2].215	.32	.215
Do			Arrey Canal, levees A, C, D, and E	do	27,500	.170	.32	.170
Do	Mar. 10, 1917	Local adv.	Levee at Percha Dam	do	18,400	.135	.175	.135
Do	May 23, 1917	366	Garfield Canal, schedules 1 to 8	do	196,000	[3].17	.195	.170

[1] Only one bid.
[2] A bid for five schedules at 14 cents per cubic yard was received, but rejected because check covering only two schedules was inclosed and bid at $0.215 was for all or none.
[3] Contract awarded, but not executed at close of fiscal year.

Unit bids and contract prices on formal specifications—Continued.

EXCAVATION, CLASS 1—Continued.

State and project.	Date opening bids.	Specification No.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Wyoming, Shoshone	Sept. 27, 1916	331	Frannie division, first unit, structures, schedule 1.	Cubic yards	1,800	$0.36	(1)	$0.36
Do	do	331	Frannie division, first unit, structures, schedule 2.	do	1,500	.36	(1)	.36
Do	Apr. 24, 1917	331	Frannie division, first unit, structures, schedule 3.	do	500	.80	(1)	.80
Do	May 1, 1917	364	Garland division, lateral 67 F, structures	do	3,000	.50	(1)	.50

EXCAVATION, CLASS 2.

Colorado, Grand Valley	Sept. 14, 1916	345	Laterals, second and third districts, schedule 1	Cubic yard	2,000	$0.20	$0.24	$0.25
Do	do	345	Laterals, second and third districts, schedule 2.	do	5,000	.20	.24	.24
Do	do	345	Laterals, second and third districts, schedule 3.	do	3,000	.13	.25	.13
Do	do	345	Laterals, second and third districts, schedule 4.	do	4,400	.15	.25	.15
Do	do	345	Laterals, second and third districts, schedule 5.	do	2,700	.15	.27	.15
Colorado, Uncompahgre Valley	Jan. 18, 1916	323	Peach Valley lateral, schedule 1	do	900	.17½	.17½	.17½
Do	do	323	Peach Valley lateral, schedule 2	do	1,100	.1599	.16	.1599
Do	do	323	Peach Valley lateral, schedule 3	do	1,400	.1599	.17½	.1599
Do	do	323	Peach Valley lateral, schedule 4	do	2,000	.17½	.18¼	.18¼
Do	do	323	Peach Valley lateral, schedule 5	do	1,800	.1599	.17½	.1599
Do	do	323	Peach Valley lateral, schedule 6	do	1,000	.1599	.16	.1599
Do	do	323	Peach Valley lateral, schedule 7	do	1,000	.20	.20¾	.29
Do	June 26, 1916	.....	Burbank ditch	do	100	.15	.18	.15
Do	Oct. 16, 1916	.....	Buttermilk lateral, schedule 1	do	200	.33	.45	.33
Do	do	.....	Buttermilk lateral, schedule 2	do	400	.27	.27¾	.27
Do	Oct. 9, 1916	.....	Buttermilk lateral, schedule 3	do	100	.14½	.1499	.14½
Do	do	.....	Buttermilk lateral, schedule 4	do	200	.14½	.1499	.14½
Do	do	.....	Buttermilk lateral, schedule 5	do	300	.15½	.18	.15½
Do	do	.....	Buttermilk lateral, schedule 6	do	300	.17¼	.18	.17¼
Montana, Flathead (Indian)	Sept. 20, 1916	344	Pablo lateral 43A, schedule 1	do	2,000	.40	.40	.40
Do	do	344	Pablo lateral 50A, schedule 3	do	500	.40	.50	.40
Do	Oct. 10, 1916	350	Mission C lateral, schedule 1	do	900	.22	.35	.45
Do	do	350	Post F lateral, schedule 2	do	800	.22	.35	.45
Do	do	350	Post 30MA sublaterals, schedule 3	do	2,000	.23	.24	.23
Do	Nov. 28, 1916	352	Camas A Canal, schedule 1	do	1,500	.50	.60	Rejected.
Do	do	352	Camas A Canal, schedule 2	do	3,000	.45	.50	Rejected.

Do	do	352	Camas A Canal, schedule 3	do	3,400	.45	.50	Rejected.
Do	do	352	Camas A Canal, schedule 4	do	100	.35	.50	Rejected.
Do	Apr. 5, 1917	359	Camas lateral B, schedule 1	do	500	.21	.30	.30
Do	do	359	Camas lateral C, schedule 2	do	2,000	.30	.45	.30
Do	do	359	Camas lateral C, schedule 3	do	500	.45	.50	.50
Do	do	359	Camas lateral D, schedule 4	do	2,000	.31	.45	.50
Do	do	359	Post A extension, schedule 5	do	2,500	.45	.45	.45
Do	do	359	Post C extension, schedule 6	do	1,000	.45	.45	.45
Montana, Milk River	June 22, 1916	340	Bowdoin Canal system, schedule 1	do	10	.50		.50
Do	Aug. 14, 1916	341	Nelson Reservoir, South Canal system, schedules 1, 2, and 3.	do	1,500	.45		.45
Montana, Sun River	Mar. 29, 1917	358	Greenfields division, first unit, schedule 1, lateral.	do	300	.40	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2, lateral.	do	600	.40	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3, lateral.	do	500	.40	(1)	Rejected
Do	do	358	Greenfields division, first unit, schedule 1, drain.	do	100	.40	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2, drain.	do	200	.40	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3, drain.	do	100	.40	(1)	Rejected.
Do	Apr. 20, 1917		Greenfields division, refill of highway crossings	do	50	.50	(1)	.50
Do	do		Willow Creek Reservoir, spillway excavation	do	140	.35	(1)	.35
Wyoming, Shoshone	Sept. 27, 1916	331	Frannie division, first unit, structures, schedule 1.	do	10	.675	(1)	.675
Do	do	331	Frannie division, first unit, structures, schedule 2.	do	10	.675	(1)	.675
Do	Apr. 24, 1917	331	Frannie division, first unit, structures, schedule 3.	do	50	1.60	(1)	1.60
Do	May 1, 1917	364	Garland division, lateral 67 F, structures	do	50	1.50	(1)	1.50

EXCAVATION, CLASS 3.

Colorado Grand Valley	Sept. 14, 1916	345	Laterals, second and third districts, schedule 1	Cubic yards	600	$0.24	$0.40	$0.40
Do	do	345	Laterals, second and third districts, schedule 2	do	300	.24	.45	.24
Do	do	345	Laterals, second and third districts, schedule 3	do	100	.25	.40	.50
Do	do	345	Laterals, second and third districts, schedule 4	do	240	.25	.27	.50
Do	do	345	Laterals, second and third districts, schedule 5	do	600	.45	.50	.50
Colorado, Uncompahgre Valley	Jan. 18, 1916	323	Peach Valley lateral, schedule 1	do	100	.17½	.17½	.17½
Do	do	323	Peach Valley lateral, schedule 2	do	100	.1599	.16	.1599
Do	do	323	Peach Valley lateral, schedule 3	do	300	.1599	.17½	.1599
Do	do	323	Peach Valley lateral, schedule 4	do	500	.17½	.18¾	.18¾
Do	do	323	Peach Valley lateral, schedule 5	do	400	.1599	.17½	.1599
Do	do	323	Peach Valley lateral, schedule 6	do	200	.1599	.16	.1599
Do	do	323	Peach Valley lateral, schedule 7	do	200	.20¾	.50	.59
Do	June 26, 1916		Burbank ditch	do	50	.15	.19	.15

[1] Only one bid.

Unit bids and contract prices on formal specifications—Continued.

EXCAVATION, CLASS 3—Continued.

State and project.	Date opening bids.	Specification No.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Colorado, Uncompahgre Valley	Oct. 16, 1916	.....	Buttermilk lateral, schedule 1	Cubic yards	100	$0.33	$0.60	$0.33
Do	do	.....	Buttermilk lateral, schedule 2	do	250	.27	.27½	.27
Do	Oct. 9, 1916	.....	Buttermilk lateral, schedule 3	do	50	.14½	.16½	.14½
Do	do	.....	Buttermilk lateral, schedule 4	do	100	.14½	.15½	.14½
Do	do	.....	Buttermilk lateral, schedule 5	do	200	.15½	.18	.15½
Do	do	.....	Buttermilk lateral, schedule 6	do	200	.17¼	.18	.17¼
Montana, Flathead (Indian)	Sept. 20, 1916	344	Pablo lateral 43A, schedule 1	do	1,500	.48	.95	.95
Do	do	344	Pablo lateral 50A, schedule 3	do	50	.95	1.50	.95
Do	Oct. 10, 1916	350	Mission lateral C, schedule 1	do	100	.50	.95	.50
Do	do	350	Post lateral F, schedule 2	do	200	.50	1.00	.50
Do	do	350	Post 30MA sublaterals, schedule 3	do	200	.23	.95	.23
Do	Nov. 28, 1916	352	Camas A Canal, schedule 1	do	750	1.25	2.00	Rejected.
Do	do	352	Camas A Canal, schedule 2	do	1,600	1.50	1.60	Do.
Do	do	352	Camas A Canal, schedule 3	do	4,100	1.75	1.90	Do.
Do	do	352	Camas A Canal, schedule 4	do	50	.50	1.00	Do.
Do	Apr. 5, 1917	359	Camas B lateral, schedule 1	do	50	.21	1.00	1.00
Do	do	359	Camas C lateral, schedule 2	do	500	1.00	1.25	1.00
Do	do	359	Camas C lateral, schedule 3	do	50	1.00	1.25	1.00
Do	do	359	Camas D lateral, schedule 4	do	500	1.10	1.25	1.10
Do	do	359	Post A extension, schedule 5	do	500	1.25	2.00	1.25
Do	do	359	Post C extension, schedule 6	do	100	1.25	2.00	1.25
Montana, Milk River	June 22, 1916	340	Bowdoin Canal system, schedule 1	do	10	.80	.....	.80
Do	Aug. 14, 1916	341	Nelson Reservoir, South Canal system, schedules 1, 2, and 3.	do	150	.45	.....	.45
Montana, Sun River	Mar. 29, 1917	358	Greenfields division, first unit, schedule 1, lateral.	do	10	1.00	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2, lateral.	do	10	1.00	(1)	Do.
Do	do	358	Greenfields division, first unit, schedule 3, lateral.	do	10	1.00	(1)	Do.
Do	do	358	Greenfields division, first unit, schedule 1, drain.	do	10	1.00	(1)	Do.
Do	do	358	Greenfields division, first unit, schedule 2, drain.	do	10	1.00	(1)	Do.
Do	do	358	Greenfields division, first unit, schedule 3, drain.	do	10	1.00	(1)	Do.
Do	Apr. 20, 1917	.....	Willow Creek Reservoir, spillway channel	do	10	1.15	(1)	1.15
Wyoming, Shoshone	Sept. 27, 1916	331	Frannie division, first unit, structures, schedule 1.	do	5	1.125	(1)	1.125

Do	do	331	Frannie division, first unit, structures, schedule 2.	do	5	1.125	(1)	1.125
Do	Apr. 24, 1917	331	Frannie division, first unit, structures, schedule 3.	do	50	2.00	(1)	2.00
Do	May 1, 1917	364	Garland division, lateral 67F, structures	do	25	2.00	(1)	2.00

EXCAVATION, CLASS 4.

Colorado, Grand Valley	Sept. 14, 1916	345	Laterals, second and third districts, schedule 1	Cubic yards	10	$0.24	$0.25	$0.65
Do	do	345	Laterals, second and third districts, schedule 2	do	50	.24	.25	.24
Do	do	345	Laterals, second and third districts, schedule 3	do	10	.25	.50	.50
Do	do	345	Laterals, second and third districts, schedule 4	do	30	.25	.5	.50
Do	do	345	Laterals, second and third districts, schedule 5	do	10	.25	.50	.50

EXCAVATION, STRUCTURES.

Montana, Flathead (Indian)	July 18, 1916	333	Pablo laterals 70A and 71A, reissue schedule 4, class 1.	Cubic yards	7,700	$1.00		Rejected.
Do	do	333	Pablo laterals 70A and 71A, reissue schedule 4, class 2.	do	100	1.00		Do.
Do	do	333	Pablo laterals 70A and 71A, reissue schedule 4, class 3.	do	50	1.50		Do.
Do	Sept. 20, 1916	344	Pablo lateral 42A, schedule 2, class 1	do	1,800	.19	$0.60	$0.19
Do	do	344	Pablo lateral 42A, schedule 2, class 2	do	400	.40	.60	.40
Do	do	344	Pablo lateral 42A, schedule 2, class 3	do	300	.95	2.00	.95
Do	do	344	Pablo lateral 50A, schedule 4, class 1	do	4,000	.19	.30	.19
Do	do	344	Pablo lateral 50A, schedule 4, class 2	do	100	.40	.75	.40
Do	do	344	Pablo lateral 50A, schedule 4, class 3	do	50	.95	1.50	.95
Do	Oct. 10, 1916	350	Post 30MA sublaterals, schedule 4, class 1	do	4,400	.25	.40	.25
Do	do	350	Post 30MA sublaterals, schedule 4, class 2	do	100	.50	.75	1.00
Do	do	350	Post 30MA sublaterals, schedule 4, class 3	do	50	.95	1.50	2.00
Montana, Milk River	June 22, 1916	40	Bowdoin Canal system, schedule 2, class 1	do	3,600	.40		.40
Do	do	340	Bowdoin Canal system, schedule 2, class 2	do	200	.70		.70
Do	do	340	Bowdoin Canal system, schedule 2, class 3	do	10	1.50		1.50
Do	Sept. 27, 1916	347	Nelson Reservoir, South Canal system, class 1	do	10,000	.40	.45	.40
Do	do	347	Nelson Reservoir, South Canal system, class 2	do	600	.75	.75	.75
Do	do	347	Nelson Reservoir, South Canal system, class 3	do	10	1.50	1.50	1.50
Montana, Sun River	Mar. 29, 1917	358	Greenfields division, first unit, schedule 1, class 1.	do	2,300	.45	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2, class 1.	do	3,700	.45	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3, class 1.	do	4,600	.45	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 1, class 2.	do	150	.60	(1)	Rejected.

[1] Only one bid.

Unit bids and contract prices on formal specifications—Continued.

EXCAVATION, STRUCTURES—Continued.

State and project.	Date opening bids.	Specification No.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Montana, Sun River	Mar. 29, 1917	358	Greenfields division, first unit, schedule 2, class 2.	Cubic yards	200	$0.60	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3, class 2.	do	200	.60	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 1, class 3.	do	10	1.00	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2, class 3.	do	10	1.00	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3, class 3.	do	10	1.00	(1)	Rejected.
New Mexico-Texas, Rio Grande	Jan. 18, 1917	53-D	Rio Grande crossing, Picacho flume	do	1,000	.40	(1)	Rejected
Do	do	53-D	Rio Grande crossing, Garfield flume	do	3,000	1.84	(1)	Rejected.
EXCAVATION, WET.								
Montana, Milk River	Sept. 27, 1916	347	Nelson Reservoir, south	Cubic yard	1,400	$3.00	.00	$3.00
FLUME MATERIAL, FURNISHING.								
New Mexico-Texas, Rio Grande	Dec. 26, 1916	47-D	Rio Grande crossing, Garfield flume	Job	(1)	$6,304		
FLUMES, METAL, ERECTION.								
Montana, Flathead (Indian)	Oct. 10, 1916	350	Post 30MA sublaterals, 2 feet 6½ inches diameter.	Linear foot	1,008	$0.30	$0.40	$0.30
Do	do	350	Post 30MA sublaterals, 3 feet 10 inches diameter.	do	1,306	.40	.50	.40
Montana, Milk River	June 22, 1916	340	Bowdoin Canal system, schedule 2, 220 linear feet of flume 5 feet 1 inch in diameter and 20 linear feet of flume 2 feet 6½ inches in diameter.	do	240	.40		.40

Do	Sept. 27, 1916	347	Nelson Reservoir, South Canal system, 200 linear feet of flume 2 feet 3½ inches in diameter.	Lump sum		90.00	100.00	100.0
Montana, Sun River	Mar. 29, 1917	358	Greenfields division, first unit, 3 feet 2 inches diameter.	Linear foot	43	.60	(1)	Rejected.
New Mexico-Texas, Rio Grande	Jan. 18, 1917	53-D	Rio Grande crossing, Picacho flume	do	514 No. 132	1.50	(1)	Rejected
Do	do	53-D	Rio Grande crossing, Garfield flume	do	1,600 No. 156	1.25	(1)	Rejected.
Wyoming, Shoshone	Sept. 27, 1916	331	Frannie division, first unit, 3 feet 10 inches diameter.	do	105	.25	(1)	.25

FLUMES, TIMBER SUBSTRUCTURE, ERECTION.

Montana, Flathead (Indian)	Oct. 10, 1916	350	Post 30MA sublaterals, schedule 4	M ft. b. m.	38	$15.00	$35.00	$15.00

FOUNDATIONS, GRAVEL.

Montana, Milk River	Sept. 27, 1916	347	Nelson Reservoir, South Canal system, structures.	Cubic yard	100	$2.25	$3.00	$3.00
Wyoming, Shoshone	Apr. 24, 1917	331	Frannie division, first unit, structures	do	5	1.00	(1)	1.00
Do	May 1, 1917	364	Garland division, lateral 67F, structures	do	10	4.00	(1)	4.00

GATES AND OTHER METAL WORK, ERECTION.

Montana, Flathead (Indian)	July 18, 1916	333	Pablo laterals 70A and 71A, gates, etc	Pound	20,000	$0.05		Rejected.
Do	Sept. 20, 1916	344	Pablo 43A, gates, etc	do	4,000	.01	$0.02	$0.02
Do	do	344	Pablo lateral 50A, gates, etc	do	22,000	.01	.02	.02
Do	Oct. 10, 1916	350	Post 30MA sublaterals, gates, etc	do	12,500	.01	.02	.02

GATES AND OTHER METAL WORK (EXCEPT REINFORCING STEEL), PLACING.

Montana, Sun River	Mar. 29, 1917	358	Greenfields division, first unit, schedule 1	Pound	14,000	$0.035	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2	do	16,000	.035	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3	do	12,000	.035	(1)	Rejected.

[1] Only one bid.

Unit bids and contract prices on formal specifications—Continued.

GATES, CAST IRON WITH OPERATING DEVICE.

State and project.	Date opening bids.	Specification No.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Montana, Flathead (Indian)	Jan. 10, 1917	355	Butterfly Gate, 6 feet 3 inches diameter	Each	2	$2,142.00	(1)	(1)
Do	do	355	Cylinder gate, 6 feet diameter	do	5	2,091.50	(1)	(1)

GATES, STRUCTURAL STEEL WITH LIFTING DEVICES, FURNISHING.

Montana, Sun River	June 1, 1917	87-D	12-inch diameter, L=5 feet 9 inches, d=12 inches.	Each	1	$31.49	$25.00	$31.49
Do	do	87-D	12-inch diameter, L=6 feet, d=12 inches	do	6	31.65	25.00	31.65
Do	do	87-D	12-inch diameter, L=9 feet, d=12 inches	do	1	33.77	25.00	33.77
Do	do	87-D	15-inch diameter, L=6 feet 3 inches, d=12 inches.	do	10	33.49	26.00	33.49
Do	do	87-D	15-inch diameter, L=6 feet 6 inches, d=12 inches.	do	4	33.65	26.00	33.65
Do	do	87-D	15-inch diameter, L=6 feet 9 inches, d=12 inches.	do	5	33.81	26.00	33.81
Do	do	87-D	15-inch diameter, L=7 feet 3 inches, d=12 inches.	do	1	34.08	26.00	34.08
Do	do	87-D	15-inch diameter, L=7 feet 6 inches, d=12 inches.	do	1	34.18	26.00	34.18
Do	do	87-D	15-inch diameter, L=9 feet, d=12 inches	do	1	35.11	26.00	35.11
Do	do	87-D	15-inch diameter, L=11 feet 3 inches, d=15 inches.	do	1	37.29	26.00	37.29
Do	do	87-D	18-inch diameter, L=6 feet 6 inches, d=12 inches.	do	8	37.37	38.00	37.37
Do	do	87-D	18-inch diameter, L=6 feet 9 inches, d=12 inches.	do	25	37.59	38.00	37.59
Do	do	87-D	18-inch diameter, L=12 feet 3 inches, d=18 inches.	do	1	43.15	41.00	43.15
Do	do	87-D	18-inch diameter, L=17 feet 9 inches, d=24 inches.	do	1	50.05	65.00	50.05
Do	do	87-D	24-inch diameter, L=5 feet 9 inches, d=12 inches.	do	12	40.44	50.00	40.44
Do	do	87-D	24-inch diameter, L=6 feet, d=15 inches	do	2	41.59	50.00	41.59
Do	do	87-D	24-inch diameter, L=8 feet 3 inches, d=24 inches.	do	1	43.89	50.00	43.89

Do	do	87-D	24-inch diameter, L=8 feet 6 inches, d=24 inches.	do	4	44.05	50.00	44.05
Do	do	87-D	24-inch diameter, L=9 feet, d=24 inches	do	1	44.39	50.00	44.39
Do	do	87-D	24-inch diameter, L=10 feet 6 inches, d=24 inches.	do	2	46.01	50.00	46.01
Do	do	87-D	30-inch diameter, L=6 feet, d=24 inches	do	1	52.70	72.50	52.70
Do	do	87-D	30-inch diameter, L=6 feet 3 inches, d=24 inches.	do	1	53.04	72.50	53.04
GRAVEL, HAULING.								
Wyoming, Shoshone	Sept. 27, 1916	331	Frannie division, first unit, structures, schedule 1.	Cubic yard	60	$2.75	(1)	$2.75
GRAVEL, PLACING.								
Wyoming, Shoshone	Sept. 27, 1916	331	Frannie division, first unit, structures, schedule 2.	Cubic yard	40	$2.75	(1)	$2.75
GRAVEL, SCREENED.								
Montana, Flathead (Indian)	July 18, 1916	333	Pablo lateral 70A and 71A, reissue schedule 4	Cubic yard	25	$3.00		Rejected.
Do	Oct. 10, 1916	350	Post 30MA sublaterals	do	20	1.50	$2.50	$1.50
GUARD POSTS, HIGHWAY, PLACING.								
Montana, Sun River	Mar. 29, 1917	358	Greenfields division, first unit, schedule 1	Each	70	$0.50	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2	do	100	.50	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3	do	90	.50	(1)	Rejected.
LUMBER, ERECTION.								
New Mexico-Texas, Rio Grande	Jan. 18, 1917	53-D	Rio Grande Crossing, Picacho flume	M ft. b. m	17	$22.00	(1)	Rejected.
Do	do	53-D	Rio Grande Crossing, Garfield flume	do	60	33.00	(1)	Rejected.
Wyoming, Shoshone	Sept. 27, 1916	331	Frannie division, first unit, structures, schedule 1.	do	42,000	18.00	(1)	$18.00
Do	do	331	Frannie division, first unit, structures, schedule 2.	do	20,000	18.00	(1)	18.00
Do	Apr. 24, 1917	331	Frannie division, first unit, structures	do	3,000	15.00	(1)	15.00
Do	May 1, 1917	364	Garland division, lateral 67F, structures	do	10,000	20.00	(1)	20.00

[1] Only one bid.

Unit bids and contract prices on formal specifications—Continued.

LUMBER, PLACING.

State and project.	Date opening bids.	Specification No.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Montana, Flathead (Indian)	Oct. 10, 1916	350	Post 30MA laterals, bridges	M ft. b. m	26	$12.00	$20.00	$12.00
Montana, Milk River	June 22, 1916	340	Bowdoin Canal system, schedule 2, for bridges.	do	8	18.00		18.00
Do	do	340	Bowdoin Canal system, schedule 2, for turnouts, weirs, checks, flumes, etc.	do	42	20.00		20.00
Do	Sept. 27, 1916	347	Nelson Reservoir, South Canal system, for bridges.	do	24	18.00	18.00	18.00
			Nelson Reservoir, South Canal system, in flume crossing.	do	5	30.00	30.00	30.00
Do	do	347	Nelson Reservoir, South Canal system, for turnouts, weirs, checks, drops, etc.	do	105	20.00	21.00	20.00

LUMBER, PLACING IN HIGHWAY BRIDGES.

Montana, Sun River	Mar. 29, 1917	358	Greenfields division, first unit, schedule 1	M ft. b. m	8.0	$20.00	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2	do	15.0	20.00	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3	do	18.5	20.00	(1)	Rejected.

LUMBER, PLACING IN WEIRS AND FLUMES.

Montana, Sun River	Mar. 29, 1917	358	Greenfields division, first unit, schedule 1	M ft. b. m	9.0	$30.00	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2	do	9.0	30.00	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3	do	10.0	30.00	(1)	Rejected.

METAL WORK, PLACING.

Wyoming, Shoshone	Apr. 24, 1917	331	Frannie division, first unit, structures	Pounds	1,000	$0.015	(1)	$0.015
Do	May 1, 1917	364	Garland division, lateral 67 F, structures	do	3,400	.03	(1)	.03

OVERHAUL.

Montana, Flathead (Indian)	Sept. 20, 1916	344	Pablo lateral 43A, schedule 1	Sta. yard	1,000	(2)	(2)	$0.02
Do	do	344	Pablo lateral 50A, schedule 3	do	10,000	(2)	(2)	.02
Do	Oct. 10, 1916	350	Mission C lateral, schedule 1	do	10,000	(2)	(2)	.02
Do	do	350	Post F lateral, schedule 2	do	10,000	(2)	(2)	.02
Do	do	350	Post 30MA sublaterals, schedule 3	do	5,000	(2)	(2)	.02
Do	Nov. 28, 1916	352	Camas A Canal, schedule 1	do	3,000	(2)	(2)	.02
Do	do	352	Camas A Canal, schedule 2	do	100	(2)	(2)	.02
Do	do	352	Camas A Canal, schedule 3	do	7,000	(2)	(2)	.02
Do	do	252	Camas A Canal, schedule 4	do	100	(2)	(2)	.02
Do	Apr. 5, 1917	359	Camas lateral B, schedule 1	do	5,000	(2)	(2)	.02
Do	do	359	Camas lateral C, schedule 2	do	100	(2)	(2)	.02
Do	do	359	Camas lateral C, schedule 3	do	5,000	(2)	(2)	.02
Do	do	359	Camas lateral D, schedule 4	do	5,000	(2)	(2)	.02
Do	do	359	Post A extension, schedule 5	do	500	(2)	(2)	.02
Do	do	359	Post C extension, schedule 6	do	100	(2)	(2)	.02
Montana, Milk River	June 22, 1916	340	Bowdoin Canal system, schedule 1	Sta. cubic yard	1,000	(2)	(2)	.02
Do	Aug. 14, 1916	341	Nelson Reservoir, South Canal system, schedules 1, 2, and 3.	do	60,000	(2)	(2)	.02
Do	Sept. 27, 1916	347	Nelson Reservoir, South Canal system, structures.	do	1,000	(2)	(2)	.02
Do	Apr. 25, 1917	363	Nelson Reservoir, South Canal	do	70,000	$0.02	.02	.02
Montana, Sun River	Mar. 29, 1917	358	Greenfields division, first unit, schedule 1	Cubic yard	2,600	.04	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2	do	8,800	.04	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3	do	6,100	.04	(1)	Rejected.
New Mexico-Texas, Rio Grande	Nov. 24, 1916	353	Arrey Canal, schedules 1 to 7, and levees A, C, D, and E.	Sta. cubic yard	76,000	.015	.03	.015
Do	Mar. 10, 1917	L. adv.	Levee at Percha Dam	do	100	.015	.02	.015
Do	May 23, 1917	366	Garfield Canal, schedules 1 to 8	do	76,000	.015	.02	.015

PAVING (DRY).

Montana, Flathead (Indian)	July 18, 1916	333	Pablo lateral 70A-71A, 12 inches	Square yard	1,200	$1.60		Rejected.
Do	do	333	Pablo lateral 70A-71A, 18 inches	do	100	2.00		Rejected.
Do	Sept. 20, 1916	344	Pablo lateral 43A, schedule 2, 12 inches	do	200	.95	$1.00	$0.95
Do	do	344	Pablo lateral 43A, schedule 2, 18 inches	do	100	1.42	1.50	1.42
Do	do	344	Pablo lateral 50A, schedule 4, 12 inches	do	600	.95	1.00	.95
Do	do	344	Pablo lateral 50A, schedule 4, 18 inches	do	70	1.42	1.50	1.42
Do	Oct. 10, 1916	350	Post 20MA sublaterals, 12 inches	do	650	1.00	1.00	1.00
Do	do	350	Post 30MA sublaterals, 18 inches	do	90	1.50	1.50	1.50
Montana, Milk River	June 22, 1916	340	Bowdoin Canal system, schecule 2, structures	do	225	2.00		2.00
Do	Sept. 27, 1916	347	Nelson Reservoir, South Canal system, structures, Class 1, 12 inches thick.	do	600	2.00	2.00	2.00
Do	do	347	Nelson Reservoir, South Canal system, structures, Class 2, 16 inches thick.	do	550	2.25	2.30	2.25

[1] Only one bid.

[2] Price fixed in schedule.

Unit bids and contract prices on formal specifications—Continued.

PAVING (GROUTED).

State and project.	Date opening bids.	Specification No.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Montana, Flathead (Indian)	July 18, 1916	333	Pablo lateral 70A–71A, 12 inches	Square yard	1,260	$1.85		Rejected.
Do	Sept. 20, 1916	344	Pablo lateral 43A, schedule 2, 12 inches	do	30	1.25	$1.50	$1.25
Do	do	344	Pablo lateral 50A, schedule 4, 12 inches	do	50	1.25	1.50	1.25
Do	Oct. 10, 1916	350	Post 30MA sublaterals, 12 inches	do	340	1.50	1.50	1.50
Wyoming, Shoshone	May 1, 1917	364	Garland division lateral 67F, 9 inches	do	1,300	2.00	(1)	2.00
Do	do	364	Garland division lateral 67F, 12 inches	do	250	2.00	(1)	2.00

PAVING, RUBBLE CONCRETE.

Montana, Milk River	June 22, 1916	340	Bowdoin Canal system, schedule 2, structures.	Square yard	225	$2.50		$2.50
Do	Sept. 27, 1916	347	Nelson Reservoir, South Canal system, structures.	do	150	2.50	$3.00	2.50
Montana, Sun River	Mar. 29, 1917	358	Greenfields division, first unit, schedule 1	do	260	2.75	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2	do	160	2.75	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3	do	270	2.75	(1)	Rejected.
New Mexico–Texas, Rio Grande	Jan. 18, 1917	53–D	Rio Grande crossing, Picacho flume	do	75	8.50	(1)	Rejected.
Do	do	53–D	Rio Grande crossing, Garfield flume	do	75	11.00	(1)	Rejected.

PILING, DRIVING.

New Mexico–Texas, Rio Grande	Jan. 18, 1917	53–D	Rio Grande crossing, Picacho flume	Linear foot	3,360	$0.20	(1)	Rejected.
Do	do	53–D	Rio Grande crossing, Garfield flume	do	10,000	.40	(1)	Rejected.

PIPE, CONCRETE, LAYING.

Montana, Sun River	Mar. 29, 1917	358	Greenfields division, first unit, schedule 1, 12 inches diameter.	Linear foot	50	$0.30	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 1, 15 inches diameter.	do	150	.35	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 1, 18 inches diameter.	do	650	.40	(1)	Rejected.

Do	do	358	Greenfields division, first unit, schedule 1, 24 inches diameter.	do	220	.55	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 1, 30 inches diamteer.	do	18	.75	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2, 12 inches diameter.	do	70	.30	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2, 15 inches diameter.	do	190	.35	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2, 18 inches diameter.	do	640	.40	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2, 24 inches diameter.	do	150	.55	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2, 30 inches diameter.	do	40	.75	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3, 12 inches diameter.	do	40	.30	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3, 15 inches diameter.	do	140	.35	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3, 18 inches diameter.	do	270	.40	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3, 24 inches diameter.	do	320	.55	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3, 30 inches diameter.	do	350	.75	(1)	Rejected.

PIPE, CONCRETE, MANUFACTURING AND LAYING.

Montana, Flathead (Indian)	July 18, 1916	333	Pablo lateral 70A–71A, 12 inches	Linear feet	1,500	$1.05		Rejected.
Do	do	333	Pablo lateral 70A–71A, 15 inches	do	740	1.30		Rejected.
Do	do	333	Pablo lateral 70A–71A, 18 inches	do	1,100	1.60		Rejected.
Do	do	333	Pablo lateral 70A–71A, 24 inches	do	230	1.95		Rejected.
Do	Sept. 20, 1916	344	Pablo lateral 43A, 12 inches	do	300	.55	$0.60	$0.55
Do	do	344	Pablo lateral 43A, 15 inches	do	120	.65	.75	.65
Do	do	344	Pablo lateral 43A, 18 inches	do	110	.85	.90	.85
Do	do	344	Pablo lateral 43A, 24 inches	do	30	1.00	1.15	1.15
Do	do	344	Pablo lateral 50A, 12 inches	do	1,300	.55	.60	.55
Do	do	344	Pablo lateral 50A, 15 inches	do	715	.65	.75	.65
Do	do	344	Pablo lateral 50A, 18 inches	do	820	.85	.90	.85
Do	do	344	Pablo lateral 50A, 24 inches	do	110	1.15	1.00	1.15

PIPE, CORRUGATED IRON, LAYING.

Montana, Milk River	June 22, 1916	340	Bowdoin Canal system, schedule 2, 36 inches	Linear feet	40	$0.50		$0.50
Do	Sept. 27, 1916	347	Nelson Reservoir South Canal system, 24 and 36 inches.	do	250	.50	$0.75	.75

[1] Only one bid.

Unit bids and contract prices on formal specifications—Continued.

PIPE, CORRUGATED METAL, PLACING.

State and project.	Date opening bids.	Specification No.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Montana, Sun River	Mar. 29, 1917	358	Greenfields division, first unit, schedule 1, 18 inches diameter.	Linear feet	80	$0.25	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 1, 24 inches diameter.	do	14	.30	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 1, 30 inches diameter.	do	36	.40	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 1, 36 inches diameter.	do	18	.50	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2, 18 inches diameter.	do	180	.25	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2, 20 inches diameter.	do	18	.30	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2, 24 inches diameter.	do	80	.35	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2, 30 inches diameter.	do	18	.40	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3, 20 inches diameter.	do	50	.25	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3, 24 inches diameter.	do	60	.35	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3, 30 inches diameter.	do	180	.50	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3, 42 inches diameter.	do	18	.75	(1)	Rejected.

PIPE, VITRIFIED, LAYING.

Montana, Flathead (Indian)	Sept. 20, 1916	344	Pablo lateral 43A, schedule 2, 10 inches	Linear feet	570	$0.10	$0.25	$0.25
Do	do	344	Pablo lateral 50A, schedule 4, 10 inches	do	750	.10	.25	.25
Do	Oct. 10, 1916	350	Post 30MA sublaterals, 12 inches	do	390	.25	.30	.75
Do	do	350	Post 30MA sublaterals, 15 inches	do	410	.45	.70	.90
Do	do	350	Post 30MA sublaterals, 18 inches	do	310	.50	.54	1.00
Montana, Milk River	June 22, 1916	340	Bowdoin Canal system, schedule 2, 18, and 24 inches.	do	90	.50		.50
Do	Sept. 27, 1916	347	Nelson Reservoir, South Canal system, 10, 12, and 18 inches.	do	450	.35	.65	.35

Do	do	347	Nelson Reservoir, South Canal system, 24 inches.	do	250	.70	.75	.70
Do	do	347	Nelson Reservoir, South Canal system, 30 inches.	do	250	.80	.90	.90
Wyoming, Shoshone	do	331	Frannie division, first unit, schedule 1, 15 inches.	do	500	.27	(1)	.27
Do	do	331	Frannie division, first unit, schedule 1, 18 inches.	do	120	.34	(1)	.34
Do	do	331	Frannie division, first unit, schedule 1, 24 inches.	do	140	.55	(1)	.55
Do	do	331	Frannie division, first unit, schedule 1, 30 inches.	do	430	.60	(1)	.60
Do	do	331	Frannie division, first unit, schedule 1, 33 inches.	do	115	.775	(1)	.775
Do	do	331	Frannie division, first unit, schedule 2, 15 inches.	do	500	.27	(1)	.27
Do	do	331	Frannie division, first unit, schedule 2, 18 inches.	do	100	.34	(1)	.34
Do	do	331	Frannie division, first unit, schedule 2, 24 inches.	do	375	.55	(1)	.55
Do	do	331	Frannie division, first unit, schedule 2, 30 inches.	do	300	.60	(1)	.60
Do	do	331	Frannie division, first unit, schedule 2, 33 inches.	do	170	.775	(1)	.775
Do	Apr. 24, 1917	331	Frannie division, first unit, schedule 2, 12 and 24 inches.	do	200	.30	(1)	.30
Do	May 1, 1917	364	Garland division, lateral 67F, 15 inches	do	710	.30	(1)	.30
Do	do	364	Garland division, lateral 67F, 18 inches	do	215	.40	(1)	.40
Do	do	364	Garland division, lateral 67F, 30 inches	do	21	1.00	(1)	1.00

PIPE, WOODSTAVE, FURNISHED AND ERECTED.

Montana, Flathead (Indian)	Oct. 20, 1916	41D	Grand Coulee Siphon, 30 inches, redwood	Linear feet	536	$2.77		$2.77
Do	do	41D	Grand Coulee Siphon, alternate, 30 inches, fir, painted.	do	536	2.69	3.98	

RIPRAP, GRAVEL.

Montana, Flathead (Indian)	July 18, 1916	333	Pablo lateral 70A–71A	Cubic yard	25	$3.00		Rejected.
Do	Sept. 20, 1916	344	Pablo lateral 43A	do	10	1.25	$1.75	$1.25
Do	do	344	Pablo lateral 50A	do	25	1.25	1.75	1.25
Do	Oct. 10, 1916	350	Post 30MA sublaterals	do	100	2.00	2.50	2.00

[1] Only one bid.

Unit bids and contract prices on formal specifications—Continued.

STATIONARY PARTS FOR MOVABLE CREST, SHERBURNE LAKES SPILLWAY.

State and project.	Date opening bids.	Specification No.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Montana, Milk River, St. Mary storage.	July 31, 1916	F-12	Stationary parts for movable crest, Sherburne Lakes spillway, Item 1 of schedule (steel parts for foundation plate for four movable crests).	Lump sum				$950.00
Do	do	F-12	Stationary parts for movable crest, Sherburne Lakes spillway, Item 2 of schedule (all parts required for the weir crest of four movable crests).	do				2,118.00

STEEL REINFORCING, PLACING.

Montana, Flathead (Indian)	July 18, 1916	333	Pablo lateral 70A-71A, reissue schedule 4	Pounds	59,500	$0.02		Rejected.
Do	Sept. 20, 1916	344	Pablo lateral 43A, schedule 2	do	8,350	.0075	$0.02	$0.02
Do	do	344	Pablo lateral 50A, schedule 4	do	36,000	.0075	.02	.02
Do	Oct. 10, 1916	350	Post 30MA sublaterals	do	23,500	.01	.02	.01
Montana, Milk River	June 22, 1916	340	Bowdoin Canal system, schedule 2	do	14,000	.01		.01¾
Do	Sept. 27, 1916	347	Nelson Reservoir South Canal system	do	40,000	.019	.02	.02
Montana, Sun River	Mar. 29, 1917	358	Greenfields division, first unit, schedule 1	do	9,000	.02	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 2	do	8,000	.02	(1)	Rejected.
Do	do	358	Greenfields division, first unit, schedule 3	do	10,000	.02	(1)	Rejected.
New Mexico-Texas, Rio Grande	Jan. 18, 1917	53-D	Rio Grande crossing, Picacho flume	do	4,700	.015	(1)	Rejected.
Do	do	53-D	Rio Grande crossing, Garfield flume	do	15,000	.023	(1)	Rejected.
Wyoming, Shoshone	Sept. 27, 1916	331	Frannie division, first unit, structures, schedule 1.	do	22,000	.02	(1)	.02
Do	do	331	Frannie division, first unit, structures, schedule 2.	do	15,000	.02	(1)	.02
Do	Apr. 24, 1917	331	Frannie division, first unit, structures, schedule 3.	do	7,000	.015	(1)	.015
Do	May 1, 1917	364	Garland division, lateral 67F, structures	do	5,000	.03	(1)	.03

STEEL, STRUCTURAL, ERECTING.

Montana, Milk River	June 22, 1916	340	Bowdoin Canal system, schedule 2	Pounds	500	$0.02		$0.02
New Mexico-Texas, Rio Grande	Jan. 18, 1917	53-D	Rio Grande crossing, Picacho flume	do	72,300	1,476.00	(1)	Rejected.
Do			Rio Grande crossing, Garfield flume	do	268,000	5,014.00	(1)	Rejected.
Wyoming, Shoshone	Sept. 27, 1916	331	Frannie division, first unit, structures, schedule 1.	do	400	.02	(1)	.02
Do	do	331	Frannie division, first unit, structures, schedule 2.	do	4,000	.02	(1)	.02

STEEL, STRUCTURAL, FURNISHING.

New Mexico-Texas, Rio Grande	Jan. 18, 1917	55-D	Bridge for Garfield flume	Job	[2] 272,000	[2] $16,700	[2 3] $17,598	$16,700

WALL, DRY WALL.

Montana, Flathead (Indian)	Sept. 20, 1916	344	Pablo lateral 43A, schedule 2	Cubic yard	210	$1.60	$2.00	$1.60

[1] Only 1 bid.

[2] Bridge company's own design.

[3] Estimated weight, 280,000 pounds.

ENGINEERING DATA FOR PROJECTS ON COMPLETION.

[The following tables of data for projects at completion, covering reservoirs, storage dams, diversion dams, canals, tunnels, and irrigable area, are necessarily subject to some revision as the projects develop and more detailed plans are prepared. In so far as they refer to works yet to be built or areas not yet covered by canal, they are not to be taken as guaranteeing that such work will ever be done. All future work depends on appropriations therefor by Congress.]

Engineering data for projects when completed.

RESERVOIRS.

Projects.	Name.	Area.	Capacity.	Spillways.			
				Length.	Elevation above stream bed.	Capacity.	
						Normal.	Maximum.
		Acres.	*Acre-feet.*	*Feet.*	*Feet.*	*Sec.-ft.*	*Sec.-ft.*
Arizona: Salt River	Roosevelt	16,832	1,365,000	420	225	.....	.....
California: Orland	East Park	1,850	51,000	415	88	8,000	12,000
Colorado: Uncompahgre Valley.	Taylor Park	2,260	106,000	(1)	(1)	(1)	(1)
Idaho:							
Boise	Deer Flat	9,835	177,000	None.	.....	.....	.....
Do	Arrowrock	2,860	280,000	402	247	15,000	40,000
Minidoka	Lake Walcott	11,350	[2] 150,000	2,385	42	40,000	60,000
Do	Jackson Lake	25,530	789,000	160	41	7,500	13,000
Montana:							
Milk River	St. Mary Lakes	6,910	124,000	500	20	[3] 500	20,000
Do	Sherburne Lakes	2,000	78,000	200	70	[3] 200	8,000
Do	Nelson Reservoir	6,020	132,000	(4)	[4] 35	.....	.....
Do	Point of Rocks	180	830	740	8	[3] 0	700
Do	Beaver Creek	5,800	60,000	.....	39	[3] 100	5,000
Sun River	Willow Creek	2,696	86,000	200	100	725	(1)
Do	Sun River Storage	3,540	269,000	580	321	14,000	46,000
Do	Pishkun Reservoir	1,542	45,700	Under control.		.....	.....
Do	Muddy Creek	1,828	33,000	.....	80	284	(1)
Do	Benton Lake	9,300	144,000	Under control.		.....	.....
Nebraska-Wyoming: North Platte.	Pathfinder	22,700	1,070,000	605	184	40,000	.....
Do	Lake Alice	900	11,400	100	18	2,500	.....
Do	Lake Minatare	2,240	67,000	100	55	2,000	.....
Nevada: Truckee-Carson	Lake Tahoe	120,000	120,000	85	6	.....	.....
Do	Alkali Flat	8,500	88,000	(1)	(1)	.....	.....
Do	Lahontan	12,000	290,000	500	112	.....	30,000
New Mexico: Carlsbad	Avalon	970	6,200	1,026	21	86,000	.....
Do	McMillan	7,860	51,500	1,500	23.7-24.5	17,000	32,000
Hondo	Hondo	1,910	40,000	None.	.....	.....	.....
New Mexico-Texas: Rio Grande.	Elephant Butte	40,080	2,638,000	275	193	8,000	16,000
Oklahoma: Lawton	Lake Lawtonka	1,080	12,000	257	50	3,200	4,600
Oregon: Umatilla	Cold Springs	1,500	50,000	330	90	6,000	6,000
Oregon-California: Klamath.	Upper Klamath Lake	60,000	264,000	None.	.....	.....	.....
Do	Clear Lake	25,000	462,000	357	24	10,000	30,000
South Dakota: Belle Fourche.	Belle Fourche	8,010	203,000	314	100	2,000	2,000
Do	Nine Mile	150	2,500	20	20	(1)	(1)
Utah: Strawberry Valley.	Strawberry Valley	8,370	250,000	58	61	500	2,000
Washington:							
Okanogan	Salmon Lake	200	3,200	None.	.....	.....	.....
Do	Conconully	460	13,000	180	55	4,500	16,000
Yakima	Bumping Lake	1,350	34,000	235	36	.....	6,000
Do	Lake Clealum	4,680	501,000	420	112	.....	18,000
Do	Lake Kachess	4,800	210,000	250	53	.....	7,200
Do	Tieton (McAllister Meadows).	1,800	185,000	350	183	.....	19,000
Do	Lake Keechelus	2,550	152,000	300	60	.....	10,000
Do	Clear Creek	126	1,700	210	35	.....	.....
Wyoming: Shoshone	Shoshone	6,600	456,600	300	233	11,000	30,000
Do	Ralston	200	2,100	.....	.....	.....	.....
INDIAN PROJECTS.							
Montana:							
Blackfeet	Two Medicine Lake	854	16,000	66	25½	[3] 250	6,000
Do	Spring Lake	1,400	29,000	50	45	[3] 0	900
Do	Four Horns	1,867	60,640	50	57	[3] 0	1,000
Do	Guardipee	1,110	22,600	170	[5] 40	[3] 0	840
Flathead	Big Draw	901	9,330	100	25	200	500
Do	Dog Lake	160	3,200	.....	[4] 30	.....	.....
Do	Dry Fork	250	2,000	250	25	500	1,500

[1] Undetermined.
[2] 53,500 acre-feet only available; above fixed crest of spillway.
[3] Average flow of stream on which reservoir is located.
[4] No spillways; drainage limited; elevation is that of water surface.
[5] Elevation above outlet.

Engineering data for projects when completed—Continued.

RESERVOIRS—Continued.

Projects.	Name.	Area.	Capacity.	Spillways.			
				Length.	Elevation above stream bed.	Capacity.	
						Normal.	Maximum.
Montana—Continued.		*Acres.*	*Acre-feet.*	*Feet.*	*Feet.*	*Sec.-ft.*	*Sec.-ft.*
Flathead	Flathead Lake	107,000	1,800,000	1,000	180	100,000	150,000
Do	Horte	73	260	40	17	140	300
Do	Hubbart	400	15,000	50	120	400	1,200
Do	Kickinghorse	675	6,800	.....	[1] 23	.....	.....
Do	Little Bitter Root Lake	3,000	9,000	.....	[1] 3	.....	.....
Do	Lower Crow Creek	300	9,485	100	82	600	1,500
Do	McConnell	100	2,000	.....	[1] 40	.....	.....
Do	McDonald Lake	220	10,600	200	51	3,000	6,000
Do	Mission	300	8,300	100	74	1,200	3,000
Do	Ninepipe	1,630	15,100	.....	[1] 30	.....	.....
Do	Pablo	2,100	29,600	.....	[1] 36	.....	.....
Do	Polson	70	1,700	.....	[1] 80	.....	.....
Do	Tabor (St. Mary Lake)	300	25,000	50	52	400	1,200
Do	Twin	70	937	.....	[1] 25	.....	.....
Fort Peck	Little Porcupine	390	3,900	.....	.....	.....	.....
Do	Big Porcupine	750	9,400	[2]	.....	.....	.....
Do	Poplar River	3,700	50,000	[2]	.....	.....	.....
Do	Wolf Creek	350	4,550	[2]	.....	.....	.....
Do	Smoke Creek	300	5,300	[2]	.....	.....	.....
Total		582,639	13,224,432	.....	.....	.....	.....

STORAGE DAMS.

Projects.	Name.	Type.	Maximum height.	Crest length.	Volume.
			Feet.	*Feet.*	*Cubic yds.*
Arizona: Salt River	Roosevelt [3]	Rubble masonry arch, gravity.	280	1,125	342,325
California: Orland	East Park [3]	Concrete arch, gravity	139	250	12,200
Colorado: Uncompahgre Valley.	Taylor Park	Undetermined	[4]	[4]	[4]
Idaho:					
Boise	Upper Deer Flat	Earth fill	70	4,000	1,190,275
Do	Lower Deer Flat [3]	....do	40	7,200	1,207,606
Do	Deer Flat Forest	....do	16	950	22,500
Do	Arrowrock [3]	Rubble concrete arch, gravity.	349	1,100	585,130
Minidoka	Minidoka [3]	Rock fill, concrete core	86	937	242,500
Do	Jackson Lake [5]	Massive concrete gate section and earth fill.	67	4,450	345,400
Montana:					
Milk River	St. Marys Lake	Earth embankment	30	2,000	135,000
Do	Sherburne Lakes [5]	....do	78	2,000	215,000
Do	Nelson Reservoir [6]	....do	39	20,730	1,016,000
Do	Point of Rocks [3]	....do	12.5	2,680	31,000
Do	Beaver Creek	....do	49	8,000	500,000
Sun River	Willow Creek [7]	Earth fill	110	1,045	452,000
Do	Sun River Storage	Masonry	329	989	296,050
Do	Pishkun	Earth fill	48	8,600	444,000
Do	Muddy Creek	....do	90	800	440,000
Do	Benton Lake	....do	40	210	12,000
Nebraska-Wyoming: North Platte.	Pathfinder [3]	Broken range masonry arch.	218	432	60,210
Do	Pathfinder Dike [3]	Earth fill	40	1,650	152,000
Do	Dam No. 1 [3]	....do	30	3,100	240,000
Do	Dam No. 1½ [3]	....do	23	2,550	119,000
Do	Minatare [3]	....do	65	3,700	570,000

[1] No spillways; drainage limited; elevation is that of water surface.
[2] Undetermined.
[3] Completed.
[4] Not designed.
[5] Under construction.
[6] Completed to height of 11 feet, with storage of 25,000 acre-feet.
[7] Completed to height of 70 feet.

Engineering data for projects when completed—Continued.

STORAGE DAMS—Continued.

Projects.	Name.	Type.	Maximum height.	Crest length.	Volume.
			Feet.	*Feet.*	*Cubic yds.*
Nevada: Truckee-Carson.	Lake Tahoe [1]	Concrete sluiceway regulator.	14	109	425
Do	Alkali Flat	Not designed			
Do	Lahontan [1]	Earth and gravel fill with concrete spillways.	124	1,400	770,000
New Mexico:					
Carlsbad	Avalon [1]	Earth and rock fill, concrete core.	50	1,380	168,773
Do	McMillan [1]	Earth and rock fill	55	2,070	150,744
Hondo	Hondo [1]	Six earth embankments	25	17,371	639,993
New Mexico-Texas: Rio Grande.	Elephant Butte [1]	Rubble concrete, gravity, straight structure.	318	[2] 1,674	[3] 605,200
Do	Elephant Butte Dike [1]	Earth fill	42	1,900	164,650
Oklahoma: Lawton	Medicine Bluff [4]	Rubble masonry	55	357	9,500
Oregon: Umatilla	Cold Springs [1]	Earth fill	98	3,800	789,500
Oregon - California: Klamath.	Clear Lake [1]	Rock fill	33	790	56,600
South Dakota: Belle Fourche.	Belle Fourche [1]	Earth fill	115	6,200	1,600,000
Do	Nine Mile	do	28	1,400	50,800
Utah: Strawberry Valley.	Indian Creek Dike [1]	Earth fill, reinforced concrete	37	1,311	101,107
Do	Strawberry Dam [1]	Earth fill, reinforced concrete core wall.	72	488	108,415
Washington:					
Okanogan	Salmon Lake [1]	Concrete headworks			
Do	Conconully [1]	Hydraulic earth fill	64	1,000	336,000
Yakima	Bumping Lake [1]	Earth fill	45	3,425	247,700
Do	Lake Clealum	Earth and gravel fill	125	700	462,000
Do	Lake Kachess [1]	do	63	1,400	193,300
Do	Tieton [5]	Earth and rock fill	200	1,000	1,219,000
Do	Lake Keechelus [1]	Earth and gravel fill	70	6,500	639,000
Do	Clear Creek [1]	Single concrete arch	63	210	2,516
Wyoming: Shoshone.	Shoshone [1]	Rubble concrete arch	328	200	78,576
Do	Ralston [1]	Earth fill	50	150	24,740
INDIAN PROJECTS.					
Montana:					
Blackfeet	Two Medicine [1]	Earth embankment	36	900	28,600
Do	Spring Lake	do	50	1,500	75,000
Do	Four Horns [6]	do	62	2,225	149,000
Flathead	Big Draw	Earth	35	3,600	137,000
Do	Dog Lake	Loose rock and earth	35	2,250	67,000
Do	Dry Fork	Earth	33	1,860	130,000
Do	Newell	Concrete	170	850	100,000
Do	Horte [1]	Earth fill	16	930	3,800
Do	Hubbart	Loose rock and earth	118	450	302,000
Do	Kickinghorse	Earth	31	3,700	181,000
Do	Little Bitter Root	do	10	300	4,000
Do	Lower Crow Creek	do	92	860	330,000
Do	McConnell	do	45	1,130	71,000
Do	McDonald Lake	Loose rock and earth	57	1,500	214,000
Do	Mission	do	80	2,500	346,000
Do	Ninepipe [7]	Earth	38	2,180	162,000
Do	Pablo [8]	do	46	14,000	1,028,000
Do	Polson	do	85	1,100	170,000
Do	Tabor	Loose rock and earth	58	2,200	140,000
Do	Twin	Earth	30	1,600	46,000
Fort Peck	Little Porcupine [1]	Earth fill	17	4,200	43,400
Do	Big Porcupine	do	30	1,500	118,000
Do	Poplar River	do	51	5,200	960,000
Do	Wolf Creek	do	36		85,300
Do	Smoke Creek	do	48		76,000
Total					22,015,835

[1] Completed.
[2] Including spillway.
[3] Including spillway, 611,000 cubic yards.
[4] Built by city of Lawton, Okla. May be raised 20 feet by Reclamation Service.
[5] Under construction.
[6] First development, 16,000; completed for 4,000 acre-feet.
[7] First development, 64,191; completed for 5,000 acre-feet.
[8] First development, 153,750; completed for 5,000 acre-feet when paved; now paved for 3,000 acre-feet.

Engineering data for projects when completed—Continued.

DIVERSION DAMS.

Projects.	Name.	Type.	Maximum height.	Crest length.	Volume.
			Feet.	*Feet.*	*Cubic yds.*
Arizona: Salt River	Granite Reef[1]	Rubble concrete weir	38	1,000	40,000
Do	Power Canal[1]	do	12¾	400	4,800
Do	Joint Head[1]	Concrete weir	10	600	1,740
Arizona - California: Yuma.	Laguna[1]	Indian weir, concrete and rock fill.[2]	40	4,780	441,732
California: Orland	South Canal[1]	Concrete on piling, with rock fill.	20	900	2,886
Do	North Side[1]	Concrete weir, with removable timber crest.	8	360	270
Do	East Park Feed Canal.[1]	Concrete arch	44	154	1,777
Colorado:					
Grand Valley	Grand River Diversion[1]	Masonry ogee weir with roller crest 10 to 15 feet high.	24	546	25,682
Uncompahgre Valley.	Gunnison[1]	Crib on rock fill and movable flashboards.	15¾	237	3,200
Do	Montrose and Delta[1]	Movable flashboard weir	6.8	68½	
Do	Loutsenhizer[1]	Pile and timber weir		100	
Do	Selig[1]	Movable flashboard weir	6	95½	
Do	Ironstone[1]	Pile foundation with deck and needle flashboards.	8½	58½	
Do	East Canal[1]	Movable flashboard weir	(3)	144	
Do	Garnet[1]	Rock basket and brush dam.			
Idaho:					
Boise	Boise River[1]	Rubble concrete weir	45	[4] 246	21,750
Minidoka	Minidoka[1]	Combined diversion and storage dam. (See Storage.)			
Montana:					
Milk River	Swift Current[1]	Earth and timber crib	13	2,800	86,700
Do	St. Mary[1]	Concrete	6.5	198	480
Do	Chinook	Reinforced concrete	20	250	3,400
Do	Dodson[5]	Timber crib, rock filled	25	319	12,000
Do	Vandalia[5]	Reinforced concrete	34	1,500	11,000
Sun River	Sun River[1]	Concrete masonry	132	212	6,200
Do	Deep Creek	Reinforced concrete	12	100	500
Montana-North Dakota: Lower Yellowstone.	Lower Yellowstone[1]	Rock-filled, timber weir	12	700	14,500
Nebraska-Wyoming:					
North Platte	Whalen[1]	Concrete weir	29	300	80,740
Nevada: Truckee-Carson.	Truckee River[1]	16 concrete sluiceways	22	171	3,322
Do	Carson River[1]	23 concrete sluiceways	21	240	2,707
New Mexico:					
Carlsbad	Avalon[1]	Combined storage and diversion. (See Storage.)			
Hondo	Hondo River[1]	Earth fill	20	100	3,700
New Mexico-Texas: Rio Grande.	Leasburg[1]	Rubble concrete weir	9	600	2,318
Do	Mesilla[1]	do.[6]	16.7	303	2,876
Do	Mexican[7]	Rubble masonry	4.7	320	
Do	Palomas	Not designed			
Do	Percha[8]	Rubble concrete	17	350	4,346
Oklahoma: Lawton	Medicine Bluff	Concrete weir	15	350	400
Oregon: Umatilla	Feed Canal (Echo)[1]	Concrete weir arch	2½	400	296
Do	Three-Mile Falls[1]	Concrete multiple arch	24	800	4,160
Oregon - California: Klamath.	Lost River[1]	Hollow reinforced concrete	40	290	5,550
South Dakota: Belle Fourche.	Diversion[1]	Concrete weir	23	400	12,149
Utah: Strawberry Valley.	Spanish Fork[1]	do	16	70	1,262
Do	Indian Creek Crossing[1]	Earth	17	1,300	15,183
Do	Horse Creek Crossing[1]	do	6	500	7,376
Do	Diverting dam at Strawberry Dam.[1]	do	6	100	1,146
Do	Diverting dam at rating flume.[1]	do	12	150	4,103
Washington:					
Okanogan	Salmon Creek[1]	Concrete weir	4½	50	132
Yakima	Sunnyside[1]	Concrete ogee weir	8½	500	2,291
Do	Tieton Diversion[1]	Concrete and rock-filled crib	3	110	334
Wyoming: Shoshone	Corbett[1]	Reinforced-concrete weir	18	400	4,951

[1] Completed.
[2] Area formed by Laguna diversion dam, 6,400 acres.
[3] Two weirs, one 6 feet by 72 feet, the other 6 feet 10 inches by 72 feet
[4] Length, including logway.
[5] Completed, except for installation of movable crest.
[6] With 6 foot 3 inch and 4 foot 6 inch tainter gate movable cres
[7] Constructed by Mexican authorities and used jointly.
[8] Under construction.

Engineering data for projects when completed—Continued.

DIVERSION DAMS—Continued.

Projects.	Name.	Type.	Maximum height.	Crest length.	Volume.
Montana:			*Feet.*	*Feet.*	*Cubic yds.*
Blackfeet	Two Medicine	Brush and rock	4	165	175
Do	Blacktail [1]	Concrete	14	54	290
Do	Badger Birch and Cut Bank.	Not yet designed			
Flathead	Jocko River	Log crib, rock filled [2]			
Do	Little Bitter Root	do			
Do	Camas A [1]	Arched masonry	25	125	500
Do	Mud Creek [1]	Concrete	12	18	116
Do	Crow Creek [1]	do	13	82	330
Do	Post Creek—Kickinghorse. [1]	Log crib, rock filled	7	110	1,500
Do	Post Creek—Pablo Feeder.	do. [2]			
Do	Mission Creek [1]	Log apron	3	80	
Do	Dry Creek	Log crib, rock filled [2]			
Do	Finley Creek	do			
Do	Agency Creek	do			
Do	Big Knife Creek [1]	Concrete	5	6	25
Do	Valley Creek	Log crib, rock filled [2]			
Do	Other small creeks	do			
Fort Peck	Little Porcupine [1]	Concrete weir on timber crib	4	150	250
Do	Poplar River [1]	do	4	300	180
Do	Big Porcupine [1]	do	6	150	185
Total					841,510

CANALS.

Projects.	Principal canals.			Mileage, with capacity in second-feet.				
	Name.	Maximum capacity.	Length.	Over 800.	300–800.	50–300.	Less than 50.	Total.
		Sec.-ft.	*Miles.*					
Arizona: Salt River	Power [1]	225	19					
Do	Arizona [1]	2,000	22	32	71	78	566	747
Do	South [1]	1,200	2					
Do	Consolidated [1]	1,000	7½					
Arizona-Cal.: Yuma	Main [1]	1,700	12					
Do	West Main	520	23	17	12	100	430	559
Do	East Main	880	24½					
California: Orland	East Park Feed [1]	250	7			7		7
Do	North Main [1]	80	4.5			8	32	40
Do	South Main [1]	225	9.1			23	75	98
Colorado:								
Grand Valley	Main [1]	1,425	62	5	39	21	232	297
Uncompahgre	South [1]	1,300	12	12		1	50	63
Do	West [1]	120	22			14	27	41
Do	Montrose and Delta [1]	450	32		16	37	80	133
Do	Loutsenhizer [1]	125	15			8	22	30
Do	Selig [1]	300	20		4	17	70	91
Do	Ironstone [3]	350	12		5	13	50	68
Do	East [1]	325	11		4	10	50	64
Do	Garnet [1]	50	10			8	4	12
Idaho:								
Boise	Main South [1]	2,500	34					
Do	Mora [1]	915	56	40	57	165	788	1,050
Do	Deer Flat, Low Line [1]	780	37					
Minidoka	North Side [1]	1,500	8	25	30	95	483	633
Do	South Side [1]	1,000	13					
Kansas: Garden City	Main [1]	115	4			2	2	4
Montana:								
Huntley	Main [1]	500	32		10	19	200	229
Do	Pumping High Line.	60	12					
Milk River	St. Mary [1]	850	29	29				29
Do	Dodson South [1]	900	44	44		66	130	240
Do	Dodson North [1]	200	29			23	37	60

[1] Completed. [2] Not yet designed. [3] Under construction.

Engineering data for projects when completed—Continued.

CANALS—Continued.

Projects.	Principal canals.			Mileage, with capacity in second-feet.				
	Name.	Maximum capacity.	Length.	Over 800.	300–800.	50–300.	Less than 50.	Total.
Montana—Continued.		*Sec.-ft.*	*Miles.*					
Milk River	Vandalia South [1]	300	48			44	41	85
Do	Nelson Reservoir North.	250	45			40	30	70
Do	Nelson Reservoir South.[2]	260	27			26	59	85
Do	Chinook	350	80		30	50	90	170
Sun River	Fort Shaw [1]	175	12			18	103	121
Do	Pishkun Reservoir supply.[1]	2,500	12	12				12
Do	Sun River Slope [1]	1,000	25.4	25.4		74	286	404.3
Do	Greenfields	850	18.9	10.9	8			
Do	Other units				50	54	210	314
Montana-North Dakota: Lower Yellowstone.	Main [1]	830	66		49	19	190	258
Nebraska-Wyoming: North Platte.	Interstate [1]	1,400	95	90	20	92	603	805
Do	Ft. Laramie	1,430	127	62	42	44	[3] 600	748
Nevada: Truckee-Carson	Truckee [1]	1,500	31					
Do	V Line [1]	1,500	8					
Do	L Line [1]	1,210	14.5					
Do	S Line [1]	1,210	18.7	42	62	80	511	695
Do	D Line [1]	440	7					
Do	AA Line [1]	400	13.4					
Do	T Line [1]	400	9					
New Mexico: Carlsbad	Main [1]	450	[4] 3		13	12	120	145
Hondo	Main Inlet [1]	[5] 2,900	1.6		3	2	45	50
New Mexico-Texas: Rio Grande.	Palomas	100	12					
Do	Arrey [2]	350	30					
Do	Leasburg [1]	485	10.8					
Do	Picacho Branch [6]	90	3.7					
Do	East Side [1]	240	10.3					
Do	West Side [1]	493	14.4		58.5	[7] 100	[7] 27	[7] 185.5
Do	Chamberino Feed [1]	70	2.2					
Do	Franklin [8]	450	31.4					
Do	San Elizario Feeder [1]	220	3.2					
Do	San Elizario Canal [9]	750	10.5					
North Dakota: North Dakota Pumping.	Buford Trenton [1]	60	6			6	39	45
Do	Williston [1]	90	3			3	57	60
Oklahoma: Lawton	Main	60	8			10		10
Oregon: Umatilla	Feed [1]	350	25					
Do	West extension main	375	26.7		33	52	90	175
Do	Maxwell	140	8					
Oregon-California: Klamath.	Main [1]	1,400	9					
Do	Keno [1]	635	1					
Do	Lost River Diversion Channel.	250	8	9	9	42	250	310
Do	East Branch [1]	260	4.5					
Do	South Branch [1]	205	13.2					
Do	Adams [1]	205	12					
Do	Griffith Lateral [1]	190	9					
South Dakota: Belle Fourche.	Inlet [1]	1,600	6½					
Do	North Side [1]	700	45	7	55	105	460	627
Do	South Side [1]	300	40					
Utah: Strawberry Valley	Power [1]	500	3.3		3.3			3.3
Do	Trail Hollow [1]	125	4			4		4
Do	Indian Creek [1]	750	2		2			2
Do	High Line [1]	300	17.5			17.5		17.5
Do	Lateral 3 [1]	30	2.2				2.2	2.2
Do	Lateral 20 [1]	55	6.1			1.1	5	6.1

[1] Completed.
[2] Under construction.
[3] Estimated.
[4] Main and Southern canals, 31 miles.
[5] Sidehill canal, built to be utilized as wasteway; length, 8,275 feet.
[6] 2.3 miles constructed.
[7] Estimated; lateral system not yet planned, so mileage can not be accurately determined.
[8] Old canal purchased by U. S. Reclamation Service and partly reconstructed.
[9] Old canal taken over by Government and not yet reconstructed.

Engineering data for projects when completed—Continued.

CANALS—Continued.

Projects.	Principal canals.			Mileage, with capacity in second-feet.				
	Name.	Maximum capacity.	Length.	Over 800.	300–800.	50–300.	Less than 50.	Total.
Utah—Continued.		*Sec.-ft.*	*Miles.*					
Strawberry Valley..	Lateral 30 [1]	66	8.5	.....	.....	3.5	5	8.5
Do	Lateral 31 [1]	10	.....	.....	.....	.....	.....	.....
Do	Lateral 32 [1]	50	2.9	.....	.....	0.8	2.1	2.9
Do	Lateral 33	150	2.2	.....	.....	2.2	.....	2.2
Do	Lateral 34 [1]	55	11.1	.....	.....	1.3	9.8	11.1
Do	Miscellaneous laterals and sublaterals.	12	31.4	.....	.....	.....	31.4	31.4
Washington:								
Okanogan	Main [1]	110	2	.....	.....	10	69	79
Yakima	Sunnyside Main [1]	1,200	60	31	19	15	342	407
Do	Snipes Mountain [1]	160	13	.....	.....	10	42	52
Do	Rocky Ford [1]	100	13	.....	.....	1	29	30
Do	Manton [1]	110	14	.....	.....	8	44	52
Do	Benton Extension [1]	80	16	.....	.....	9	13	22
Do	Tieton [1]	300	12	.....	12	32	291	335
Wyoming: Shoshone	Garland [1]	1,000	18	10.6	16.6	60.7	274.8	362.7
INDIAN PROJECTS.								
Montana:								
Blackfeet	Two Medicine	350	25	.....	55	144	600	799
Do	Fisher	370	30					
Do	Birch	45	6					
Do	Cutbank North	250	30					
Do	Cutbank South	300	20					
Do	Four Horns Supply	165	12					
Flathead	Tabor Feeder	300	11	.....	14	82	800	896
Do	Pablo Feeder	300	44					
Do	Kickinghorse Feeder [1]	400	4					
Do	Ninepipe Feeder	250	2					
Do	Pablo Lateral A [1]	400	17					
Do	Camas A	150	10					
Fort Peck	Little Porcupine [1]	250	1	.....	.....	1	13	14
Do	Poplar River B [1]	100	29	.....	.....	11	22	33
Do	Poplar River C [1]	100		.....	.....	18	48	66
Do	Big Porcupine [1]	100	7	.....	.....	7	25	32
Do	Missouri Gravity	625	100	.....	10	30	60	100
Total				503.9	812.4	2,057.1	9,867.3	13,240.7

TUNNELS.

Projects.	Name.	Length.	Capacity.
Arizona: Salt River	Power Canal: [1]	*Feet.*	*Second-feet.*
	Intake	1,695	.....
	Lee	122	.....
	Wehrl cut-off—		
	No. 1	428	.....
	No. 2	129	.....
	No. 3	271	.....
	Wehri	151	.....
	Pinto	999	.....
	Chilton	1,027	.....
	Robinson	152	.....
	Gray	761	.....
	Moffet	214	.....
	Grapevine	872	.....
	No. 6	206	.....
	No. 7	342	.....
	No. 8	553	.....
	No. 9	320	.....

[1] Completed.

Engineering data for projects when completed—Continued.

TUNNELS—Continued.

Projects.	Name.	Length.	Capacity.
Arizona; Salt River—Continued.	Power Canal—Continued.	*Feet.*	*Second-feet.*
	No. 10	489	.....
	No. 11	625	.....
	No. 12	70	.....
	No. 13	110	.....
	Roosevelt: [1]		
	Sluicing	480	.....
	Outlet	167	.....
	Penstock	620	.....
Arizona-California: Yuma	Colorado River siphon [1]	930	1,400
Colorado:			
Grand Valley	Main Canal:		
	No. 1 [1]	3,723	1,425
	No. 2 [1]	1,655	1,425
	No. 3 [1]	7,292	670
Uncompahgre	Gunnison [1]	30,645	1,300
	South Canal: [1]		
	No. 1	482	1,300
	No. 2	395	1,300
	No. 3	1,000	1,300
	No. 4	400	1,300
	No. 5	390	1,300
	West Canal [1]	1,750	100
	West Canal Extension [1]	800	30
	Lower Selig Extension: [1]		
	No. 1	160	140
	No. 2	360	140
	No. 3	100	100
	No. 4	310	100
Idaho: Boise	Penitentiary	322	10
	Arrowrock Logway [2]	159	.....
Montana:			
Huntley	Main Canal:		
	No. 1 [1]	724	500
	No. 2 [1]	1,545	500
	No. 3 [1]	385	500
Sun River	Willow Creek [1]	639	725
	Sun River Storage	200	3,500
	Pishkun Canal:		
	No. 1 [3]	695	2,800
	No. 2 [3]	1,022	2,500
	No. 3 [3]	2,277	2,500
	Sun River Diversion Tunnel [1]	87	400
	Muddy Creek Reservoir	700	284
Nebraska-Wyoming: North Platte	Pathfinder: [1]		
	North [1]	480	6,000
	South [1]	360	6,400
	Drainage [1]	155	[4]
	Auxiliary [1]	209	[4]
	Crossout [1]	55	[4]
	Fort Laramie Canal:		
	No. 1	2,700	1,430
	No. 2	2,150	1,430
	No. 3	3,700	360
Nevada: Truckee-Carson	Truckee Canal:		
	No. 1 [1]	901	1,200
	No. 2 [1]	309	1,200
	No. 3 [1]	1,515	1,200
	Gilpin Spillway [1]	115	1,200
New Mexico: Carlsbad	Spillway:		
	No. 1 [1]	97	8,000
	No. 2 [1]	103	8,000
Oregon: Umatilla	Spillway from Feed Canal [1]	34	450
Oregon-California: Klamath	Main Canal [1]	3,300	1,200
South Dakota: Belle Fourche	South Canal	1,306	350
Utah: Strawberry Valley	Strawberry [1]	19,897	600
	Strawberry Dam Sluicing	532	600
	Power Canal:		
	No. 1 [1]	800	500
	No. 2 [1]	705	500
	Highline No. 1 [1]	227	300
Washington:			
Okanogan	Conconully outlet [1]	395	900
Yakima, Tieton	Steeple, No. 1 [1]	55	350

[1] Completed.

[2] Not intended to carry water, but for the purpose of running logs which are carried over the dam and brought down through a cableway chute which ends in this tunnel.

[3] Completed to first development capacity of 1,000 second-feet.

[4] Not designed for discharge.

Engineering data for projects when completed—Continued.

TUNNELS—Continued.

Projects.	Name.	Length.	Capacity.
Washington—Continued.		*Feet.*	*Second-feet.*
	Steeple, No. 2 [1]	48	350
	Trail Creek [1]	3,120	300
	Columnar [1]	1,200	300
	Tieton [1]	2,729	300
	North Fork [1]	3,811	300
Wyoming: Shoshone	Shoshone: [1]		
	Lower outlet	498	6,000
	Spillway	405	30,000
	Upper outlet	315	
	Corbett [1]	17,355	1,000
	Ralston Reservoir [1, 2]	245	
	Frannie [1]	1,330	317
	Shoshone Road: [1]		
	No. 1	39	
	No. 2	45	
	No. 3	14	
	No. 4	28	
	No. 5	136	
	No. 6	166	
	Highline Canal: [1]		
	No. 1	4,497	600
	No. 2	247	600
	No. 3	2,100	600
	No. 4	835	600
	No. 5	265	600
	No. 6	2,025	600
	No. 7	290	560
	No. 8	283	560
	No. 9	120	380
	No. 10	185	335
	Willwood:		
	No. 1	560	300
	No. 2	365	300
INDIAN PROJECTS.			
Montana: Flathead	Newell [3]	1,800	2,500
	Tabor Reservoir Outlet	1,620	400
	Pablo 31A [1]	441	200
	Camas A	1,100	150
Fort Peck	Missouri River	4,300	625
Total		162,567	

[1] Completed.
[2] Ralston Reservoir tunnel is a sluicing tunnel for the settling basin of Corbett Tunnel.
[3] 1,703 feet driven. Completed for first development (unlined).

IRRIGABLE AREA.

State, project, and unit.	Public land.			State land.	Indian land.	Private land.		Total.
	Entered.	Open.	Withdrawn.			Railroad.	Other.	
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Arizona: Salt River	**16,170**			**11,030**			**164,877**	**192,077**
Gravity system								183,077
Pumping system								9,000
Arizona-California: Yuma	**6,500**		**38,500**	**5,800**	**8,500**		**50,700**	**110,000**
Arizona			38,500	5,800			50,700	95,000
California	6,500				8,500			15,000
Units—								
Yuma Valley (Ariz.)			6,900	3,100			45,000	55,000
Mesa pumping (Ariz.)			31,600	2,700			5,700	40,000
Reservation (Cal.)	6,500				8,500			15,000
California: Orland							**20,533**	**20,533**
North side							6,809	6,809
South side							13,404	13,404
Vested water rights							320	320
Colorado:								
Grand Valley	**9,880**		**20,190**				**22,930**	**53,000**
Gravity system	7,350		16,060				19,340	42,750
Pumping system	2,530		4,130				3,590	10,250
Uncompahgre Valley	**16,480**		**7,586**				**75,934**	**100,000**
South Canal system	2,489		551				6,336	9,376
West Canal system	2,481		54				4,039	6,574
Montrose and Delta Canal system	3,794		2,176				23,234	29,204

Engineering data for projects when completed—Continued.

IRRIGABLE AREA—Continued.

State, project, and unit.	Public land.			State land.	Indian land.	Private land.		Total.
	Entered.	Open.	Withdrawn.			Railroad.	Other.	
Colorado—Continued.								
Uncompahgre Valley—Con.	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Loutzenhizer Canal system	231	.....	22	.....	.....	.....	6,451	6,704
Selig Canal system	3,253	.....	2,415	.....	.....	.....	8,241	13,909
Ironstone Canal system	697	.....	477	.....	.....	.....	16,872	18,046
East Canal system	3,527	.....	1,891	.....	.....	.....	8,090	13,508
Garnet Canal system	8	.....	.....	.....	.....	.....	2,671	2,679
Idaho: Boise	**77,003**	.....	**3,191**	**6,960**	.....	.....	**190,212**	**277,366**
Present project lands	67,423	.....	31	3,400	.....	.....	72,956	143,810
Vested water-right lands, including Pioneer, Nampa-Meridian, and New York districts	.....	.....	.....	.....	.....	.....	80,056	80,056
Proposed extensions, including pumping areas	9,580	.....	3,160	3,560	.....	.....	37,200	53,500
Idaho: King Hill	**10,000**	.....	**500**	.....	.....	.....	**4,500**	**15,000**
Idaho: Minidoka	**95,415**	**1,024**	.....	**21,062**	.....	.....	**3,351**	**120,852**
Gravity system	65,152	1,024	.....	5,461	.....	.....	250	71,887
Pumping system	30,263	.....	.....	15,601	.....	.....	3,101	48,965
Kansas: Garden City	.....	.....	.....	.....	.....	.....	**10,677**	**10,677**
Montana: Huntley	**26,219**	**1,377**	**1,348**	.....	.....	.....	**3,992**	**32,936**
First unit	23,674	1,377	683	.....	.....	.....	3,158	28,892
Second unit	1,010	.....	.....	.....	.....	.....	834	1,844
Third unit	1,535	.....	665	.....	.....	.....	.....	2,200
Montana: Milk River	**46,000**	.....	**25,900**	**9,300**	**30,000**	.....	**108,800**	**220,000**
Dodson north	3,339	.....	560	481	.....	.....	7,588	11,968
Dodson south	9,367	.....	16,612	2,608	.....	.....	13,905	42,492
Nelson Reservoir north	6,400	.....	2,940	230	.....	.....	14,430	24,000
Nelson Reservoir south	12,614	.....	2,408	1,446	.....	.....	5,532	22,000
Vandalia south	6,780	.....	1,080	1,835	.....	.....	12,845	22,540
Chinook	7,500	.....	2,300	2,700	30,000	.....	54,500	97,000
Montana: Sun River	**46,819**	**1,650**	**36,033**	**12,546**	.....	**260**	**76,636**	**173,944**
Fort Shaw	10,891	1,650	525	268	.....	260	2,650	16,244
Sun River Slope	480	.....	10,000	1,440	.....	.....	3,080	15,000
Greenfields and Mill Coulee	29,988	.....	21,228	6,058	.....	.....	17,726	75,000
Greenfields Lake	5,460	.....	4,280	1,120	.....	.....	4,140	15,000
Benton	.....	.....	.....	1,520	.....	.....	19,480	21,000
Vaughn and Sunnyside	.....	.....	.....	2,140	.....	.....	29,560	31,700
Montana-North Dakota: Lower Yellowstone	**16,082**	**105**	**1,567**	**1,653**	.....	**3,839**	**36,870**	**60,116**
First unit	9,058	105	254	1,068	.....	2,856	28,947	42,288
Extensions	7,024	.....	1,313	585	.....	983	7,923	17,828
Nebraska-Wyoming: North Platte	**108,285**	**8**	**35,083**	**12,514**	.....	.....	**74,001**	**229,891**
Interstate unit	82,590	8	610	5,338	.....	.....	41,345	129,891
Nebraska	79,979	.....	610	5,338	.....	.....	23,295	109,222
Wyoming	2,611	8	.....	.....	.....	.....	18,050	20,669
Units—								
North Platte Canal & Colonization Co	.....	.....	.....	.....	.....	.....	17,837	17,837
First lateral district	33,046	8	337	2,128	.....	.....	4,124	39,643
Second lateral district	20,732	.....	126	1,012	.....	.....	11,753	33,623
Third lateral district	28,812	.....	147	2,198	.....	.....	7,631	38,788
Fort Laramie unit	25,695	.....	34,473	7,176	.....	.....	32,656	100,000
Nebraska	8,542	.....	7,191	3,315	.....	.....	26,179	45,227
Wyoming	17,153	.....	27,282	3,861	.....	.....	6,477	54,773
Nevada: Truckee-Carson	**20,422**	**4,211**	**94,887**	**215**	**4,640**	**24,900**	**50,725**	**200,000**
Lahontan Valley (Lower Carson)	.....	.....	.....	.....	.....	.....	.....	145,000
Truckee Canal district	.....	.....	.....	.....	.....	.....	.....	13,800
Lahontan Bench	.....	.....	.....	.....	.....	.....	.....	7,200
Churchill Valley	.....	.....	.....	.....	.....	.....	.....	14,000
Pyramid Lake extension	.....	.....	.....	.....	.....	.....	.....	20,000
New Mexico: Carlsbad	**166**	.....	.....	**1,220**	.....	.....	**23,389**	**24,775**
First	10	.....	.....	.....	.....	.....	19,945	19,955
Second	156	.....	.....	1,220	.....	.....	3,444	4,820
New Mexico: Hondo	**240**	.....	.....	.....	.....	.....	**9,760**	**10,000**
New Mexico-Texas: Rio Grande	**553**	.....	**4,890**	**2,602**	.....	**360**	**146,595**	**155,000**
New Mexico	553	.....	4,890	2,602	.....	.....	101,955	110,000
Texas	.....	.....	.....	.....	.....	360	44,640	45,000
Units—								
Palomas Valley	.....	.....	574	119	.....	.....	6,292	6,985
Rincon Valley	.....	.....	256	1,867	.....	.....	19,658	21,781

Engineering data for projects when completed—Continued.

IRRIGABLE AREA—Continued.

State, project, and unit.	Public land.			State land.	Indian land.	Private land.		Total.
	Entered.	Open.	Withdrawn.			Railroad.	Other.	
New Mexico-Texas—Continued.								
Units—Continued.								
Mesilla Valley, Leasburg unit	*Acres.* 114	*Acres.*	*Acres.* 900	*Acres.* 279	*Acres.*	*Acres.*	*Acres.* 35,479	*Acres.* 36,772
Mesilla Valley, other units	439	.....	3,160	337	.....	.....	56,496	60,432
El Paso Valley	.....	.....	.....	.....	.....	360	28,670	29,030
North Dakota: North Dakota pumping	**303**	**532**	**78**	**1,073**	.....	.....	**24,287**	**26,273**
Buford-Trenton	249	212	78	1,006	.....	.....	13,480	15,025
First division	249	212	78	91	.....	.....	3,420	4,050
Extensions	.....	.....	.....	14	.....	.....	1,361	1,375
Upper bottom division	.....	.....	.....	501	.....	.....	2,099	2,600
Lower bottom division	.....	.....	.....	.....	.....	.....	4,000	4,000
Trenton Flat	.....	.....	.....	400	.....	.....	2,600	3,000
Williston	54	320	.....	67	.....	.....	10,807	11,248
First division	54	320	.....	67	.....	.....	7,707	8,148
West bottom division	.....	.....	.....	.....	.....	.....	1,900	1,900
East bottom division	.....	.....	.....	.....	.....	.....	1,200	1,200
Oklahoma: Lawton	.....	.....	.....	.....	.....	.....	**2,500**	**2,500**
Oregon: Umatilla	**3,812**	**1,196**	**2,762**	.....	.....	**4,650**	**23,880**	**36,300**
First	386	.....	.....	.....	.....	320	6,262	6,968
Second	534	9	.....	.....	.....	78	3,677	4,298
Third	1,249	.....	.....	.....	.....	919	1,789	3,957
Fourth	349	.....	.....	.....	.....	90	1,537	1,976
Fifth	155	52	.....	.....	.....	.....	.....	207
Sixth	.....	140	.....	.....	.....	23	956	1,119
First, W. E	315	493	.....	.....	.....	399	1,092	2,299
Second, W. E	777	502	.....	.....	.....	265	1,404	2,948
Future	.....	.....	2,762	.....	.....	2,556	7,163	12,481
United States Reserve	.....	.....	47	.....	.....	.....	.....	47
Oregon-California: Klamath	**2,547**	**338**	**27,300**	.....	.....	.....	**112,611**	**142,796**
Oregon	2,341	63	4,300	.....	.....	.....	103,200	109,904
California	206	275	23,000	.....	.....	.....	9,411	32,892
Units—								
First	62	23	.....	.....	.....	.....	29,615	29,700
Second	.....	.....	.....	.....	.....	.....	8,366	8,366
Third	2,485	315	.....	.....	.....	.....	3,159	5,959
Marginal lands (Tule)	.....	.....	27,300	.....	.....	.....	241	27,541
Sand Hollow	.....	.....	.....	.....	.....	.....	13,500	13,500
Horsefly	.....	.....	.....	.....	.....	.....	22,000	22,000
Pine Grove	.....	.....	.....	.....	.....	.....	3,730	3,730
Additional units	.....	.....	.....	.....	.....	.....	32,000	32,000
South Dakota: Belle Fourche	**35,217**	**3,211**	**14,581**	**4,702**	.....	.....	**40,205**	**97,916**
First	3,235	363	.....	577	.....	.....	16,735	20,910
Second	8,500	1,545	.....	2,129	.....	.....	16,227	28,401
Third	10,556	174	.....	1,065	.....	.....	5,118	16,913
Fourth	9,596	508	.....	732	.....	.....	1,530	12,366
Fifth	3,330	621	.....	199	.....	.....	595	4,745
Willow Creek extension	.....	.....	5,896	.....	.....	.....	.....	5,896
Nine Mile extension	.....	.....	8,685	.....	.....	.....	.....	8,685
Utah: Strawberry Valley	**1,414**	**486**	.....	.....	.....	.....	**48,100**	**50,000**
Mapleton	.....	.....	.....	.....	.....	.....	3,500	3,500
Lake Shore	.....	.....	.....	.....	.....	.....	2,500	2,500
High Line	1,414	486	.....	.....	.....	.....	22,100	24,000
Spanish Fork	.....	.....	.....	.....	.....	.....	20,000	20,000
Washington: Okanogan	.....	.....	.....	.....	.....	.....	**10,099**	**10,099**
First	.....	.....	.....	.....	.....	.....	2,018	2,018
Second	.....	.....	.....	.....	.....	.....	6,085	6,085
Third	.....	.....	.....	.....	.....	.....	464	464
Old water rights	.....	.....	.....	.....	.....	.....	1,381	1,381
Town of Okanogan	.....	.....	.....	.....	.....	.....	151	151
Washington: Yakima	**4,627**	**81**	**132**	**3,432**	.....	**329**	**135,817**	**144,418**
Sunnyside unit	2,588	.....	39	1,158	.....	.....	107,043	110,828
Vested water-right lands	.....	.....	.....	.....	.....	.....	47,247	47,247
Public-notice lands	1,622	.....	39	920	.....	.....	40,495	43,076
Irrigation-district lands	966	.....	.....	238	.....	.....	19,301	20,505
Tieton unit	2,039	81	93	2,274	.....	329	28,774	33,590
Wyoming: Shoshone	**38,269**	**2,404**	**97,340**	**6,326**	.....	**750**	**2,237**	**147,326**
First	.....	.....	.....	.....	.....	.....	.....	15,196
Second	.....	.....	.....	.....	.....	.....	.....	14,926
Third	.....	.....	.....	.....	.....	.....	.....	2,777
Fourth	.....	.....	.....	.....	.....	.....	.....	6,206
Fifth (lateral A extension)	.....	.....	.....	.....	.....	.....	.....	3,563
Subsequent units	.....	.....	.....	.....	.....	.....	.....	104,658

Engineering data for projects when completed—Continued.

IRRIGABLE AREA—Continued.

State, project, and unit.	Public land.			State land.	Indian land.	Private land.		Total.
	Entered.	Open.	Withdrawn.			Railroad.	Other.	
INDIAN PROJECTS.	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Montana: Blackfeet	**11,000**		**50,020**		**61,480**			**122,500**
Cutbank North	11,000		4,320		4,680			20,000
Cutbank South			13,180		4,820			18,000
Two Medicine			19,120		28,880			48,000
Badger-Fisher			13,000		20,000			33,000
Birch			400		3,100			3,500
Montana: Flathead	**35,780**		**6,720**	[1] **9,635**	[2] **81,375**		**990**	**134,500**
Jocko	680		220	700	13,900			15,500
Mission	1,000		250	1,470	19,290		990	23,000
Post	8,300		2,700	2,450	12,550			26,000
Crow	700		50	100	13,150			14,000
Pablo	15,200		2,950	3,600	15,250			37,000
Polson	200		220	85	5,495			6,000
Big Arm	500		290	630	1,580			3,000
Camas	9,200		40	600	160			10,000
Montana: Fort Peck	**9,713**	**107**		**180**	**141,800**		**200**	**152,000**
Little Porcupine					2,610			2,610
Poplar River					28,490		200	28,690
Big Porcupine					4,000			4,000
Big Muddy					18,930			18,930
Missouri River					77,770			77,770
Galpin Bottom pumping	9,713	107		180				10,000
Milk River					10,000			10,000
Total, all projects	638,916	16,730	468,608	110,250	327,795	35,088	1,475,408	3,072,795
Per cent	20.8	0.5	15.2	3.6	10.6	1.1	48.2	100.0

[1] Largely leased and sold under contract.
[2] Allotments of deceased and incompetent Indians sold at semiannual sales.

CROP STATISTICS.

Acreage cropped and irrigated on reclamation projects in 1916.[1]

State and project.	Cereals.						Other grain and seed.						Hay and forage.							
	Barley.	Corn, Indian.	Oats.	Rye.	Wheat.	Total.	Alfalfa seed.	Clover seed.	Sorghum (grain).	Flaxseed.	Millet seed.	Total.	Alfalfa hay.	Clover hay.	Other hay.	Corn fodder.	Peas.	Other forage.	Pasture.	Total.
Arizona: Salt River	13,295	984	1,425	.....	10,081	25,785	2,739	.....	(2)	.....	.....	2,739	81,616	.....	6,061	2,080	.....	228,589	52,822	171,168
Arizona-California: Yuma	1,195	55	.....	.....	456	1,706	8,100	.....	4,897	.....	.....	12,997	10,880	.....	901	.....	.....	1,832	7,282	20,895
California: Orland	.....	.....	.....	.....	.....	.....	.....	.....	848	.....	.....	848	5,344	.....	179	.....	.....	.....	3,185	8,708
Colorado:																				
Grand Valley	48	101	243	.....	390	782	8	.....	.....	.....	.....	8	105	.....	.....	80	1	.....	30	216
Uncompahgre	503	1,725	6,438	27	9,038	17,731	288	5	.....	.....	.....	293	19,105	197	564	344	32	85	1,936	22,263
Idaho:																				
Boise	4,463	3,055	4,440	110	17,101	29,169	677	6,381	.....	.....	13	7,071	26,390	6,694	474	217	14	2	5,108	38,899
Minidoka—																				
Gravity unit	1,650	86	3,718	109	3,687	9,250	570	511	.....	.....	10	1,091	22,026	547	304	21	200	111	4,845	28,054
South Side pumping unit	965	34	2,547	16	7,341	10,903	184	1,191	.....	.....	.....	1,375	15,278	333	102	11	185	.....	3,821	19,730
Montana:																				
Huntley	299	174	2,627	.....	2,624	5,724	23	8	.....	.....	.....	31	5,422	17	300	41	.....	5	1,393	7,178
Milk River	89	25	282	.....	720	1,116	.....	.....	.....	68	.....	68	1,335	.....	2,100	.....	.....	.....	116	3,551
Ann River[7]	168	.....	643	.....	847	1,658	.....	16	.....	5	3	24	3,849	.....	241	.....	.....	.....	443	4,533
Montana-North Dakota: Lower Yellowstone	488	46	528	.....	1,251	2,313	6	7	.....	123	.....	136	3,338	.....	114	40	.....	.....	99	3,591
Nebraska-Wyoming: North Platte	4,857	6,715	10,375	158	2,617	24,722	859	.....	.....	.....	238	1,097	32,601	.....	746	69	.....	221	3,871	37,508
Nevada: Truckee-Carson	1,658	.....	107	.....	2,861	4,626	.....	.....	.....	.....	.....	.....	21,445	.....	1,310	.....	.....	.....	10,872	33,627
New Mexico:																				
Carlsbad	188	476	1,117	.....	889	2,670	2,858	.....	583	.....	.....	3,441	6,820	.....	61	.....	.....	.....	2,610	9,491
Hondo	10	75	35	.....	.....	120	.....	.....	.....	.....	.....	.....	757	.....	50	135	.....	21	.....	963
New Mexico-Texas: Rio Grande	1,271	8,253	1,623	1	5,988	17,136	607	.....	703	.....	25	1,335	37,762	.....	141	1,254	18	.....	1,211	40,386
Oregon: Umatilla	.....	100	.....	.....	.....	100	9	20	.....	.....	.....	29	2,985	1	66	100	.....	.....	612	3,764
Oregon-California: Klamath	6,968	.....	2,331	668	2,155	12,122	.....	.....	.....	.....	.....	.....	8,140	.....	2,762	.....	.....	.....	5,991	16,893
South Dakota: Belle Fourche	2,740	3,846	4,119	72	7,554	18,331	4,177	.....	.....	493	48	4,718	17,945	48	2,121	326	.....	.....	6,132	26,572
Utah: Strawberry Valley	722	53	1,966	28	6,870	9,639	20	.....	.....	.....	.....	20	6,922	.....	755	.....	.....	.....	1,973	9,650
Washington:																				
Okanogan	.....	76	.....	.....	5	81	.....	.....	.....	.....	.....	.....	1,511	94	274	60	.....	1	16	1,956
Yakima—																				
Sunnyside unit	763	8,155	98	.....	1,013	10,029	.....	.....	.....	.....	.....	.....	28,316	82	2,501	780	.....	1,208	3,705	36,592
Tieton unit	884	1,155	1,283	.....	2,522	5,844	.....	116	.....	.....	.....	116	8,425	335	1,042	403	3	4	1,060	11,272
Wyoming: Shoshone	561	.....	8,544	7	2,886	11,998	163	383	.....	.....	6	552	13,006	25	325	61	2	.....	1,382	14,801
Total for irrigated areas covered by crop reports	43,785	35,189	54,489	1,196	88,896	223,555	21,288	8,638	7,031	689	343	37,989	381,323	8,373	23,494	6,022	455	32,079	120,515	572,261

State and project.	Vegetables and truck.						Fruit and nuts.						
	Beans.	Onions.	Potatoes, white.	Potatoes, sweet.	Truck.	Total.	Apples.	Peaches.	Pears.	Prunes.	Citrus fruit.	Small fruit.	Other	Total.
Arizona: Salt River	710	.....	351	102	2,469	3,632	.....	.....	.....	.....	1,259	917	.....	[3] 3,424
Arizona-California: Yuma	234	.....	.....	.....	338	572	.....	.....	.....	.....	.....	.....	.....	[4] 89
California: Orland	.....	.....	.....	.....	224	224	.....	.....	.....	.....	121	51	160	[5] 408
Colorado:														
Grand Valley	15	.....	21	.....	22	58	366	38	100	.....	.....	6	.....	510
Uncompahgre	259	262	3,714	.....	144	4,379	2,406	132	12	14	.....	72	.....	2,636
Idaho:														
Boise	186	1	1,097	4	524	1,812	885	128	4	229	.....	57	.....	1,303
Minidoka—														
Gravity unit	35	20	1,283	.....	464	1,802	130	.....	.....	.....	.....	23	.....	153
South Side pumping unit	11	.....	1,544	.....	383	1,938	.....	.....	.....	.....	.....	.....	.....	.....
Montana:														
Huntley	.....	.....	54	.....	164	218	.....	.....	.....	.....	.....	4	.....	4
Milk River	.....	.....	11	.....	11	22	.....	.....	.....	.....	.....	.....	.....	.....
Sun River [6]	.....	.....	102	.....	27	129	.....	.....	.....	.....	.....	.....	.....	.....
Montana-North Dakota: Lower Yellowstone	2	.....	26	.....	28	56	.....	.....	.....	.....	.....	.....	.....	.....
Nebraska-Wyoming: North Platte	229	.....	1,735	.....	124	2,088	.....	.....	.....	.....	.....	.....	.....	.....
Nevada: Truckee-Carson	.....	.....	177	.....	513	690	.....	.....	.....	.....	.....	.....	.....	.....
New Mexico:														
Carlsbad	4	.....	.....	8	44	56	.....	222	.....	.....	.....	.....	.....	222
Hondo	.....	.....	.....	.....	2	2	.....	.....	.....	.....	.....	.....	.....	.....
New Mexico, Texas: Rio Grande	1,292	8	.....	226	2,193	3,719	309	194	615	.....	.....	103	.....	1,221
Oregon: Umatilla	.....	1	41	.....	56	98	209	30	7	.....	.....	36	.....	282
Oregon-California: Klamath	.....	.....	230	.....	100	330	.....	.....	.....	.....	.....	.....	.....	[4] 6
South Dakota: Belle Fourche	23	1	169	.....	116	309	.....	.....	.....	.....	.....	.....	.....	.....
Utah: Strawberry Valley	13	.....	212	.....	109	334	.....	.....	.....	.....	.....	.....	.....	[4] 122
Washington:														
Okanogan	5	2	74	.....	116	197	3,795	82	37	5	.....	23	36	3,978
Yakima—														
Sunnyside unit	85	.....	3,774	.....	951	4,810	11,315	884	1,353	238	119	355	.....	14,264
Tieton unit	168	29	1,350	.....	269	1,816	3,109	383	680	4	.....	20	.....	4,196
Wyoming: Shoshone	14	.....	263	.....	175	452	6	.....	.....	.....	.....	1	.....	7
Total for irrigated areas covered by crop reports	3,285	324	16,228	340	9,566	29,743	22,530	2,093	2,808	490	1,499	1,668	196	[7] 32,825

[1] Data are for calendar year (irrigation season) except on Salt River project. Arizona, data are for corresponding agricultural year ending Nov. 30, 1916. Figures are restricted to irrigated areas covered by crop reports, excluding about 100,000 acres irrigated, but not covered by crop reports, and small areas on few projects cropped without irrigation, except as noted for Sun River project, Montana.

[2] Grain sorghums (Kafir, milo, etc.), grown on a large acreage on Salt River project, are usually cut green for forage.

[3] Includes 1,248 acres of deciduous fruit not reported under separate fruits.

[4] Not reported under separate fruits.

[5] Includes 76 acres of deciduous fruits not listed separately.

[6] Crop reports covered 158 irrigated farms, which produced some crops without irrigation.

[7] Includes 1,541 acres not listed under separate fruits.

Acreage cropped and irrigated on reclamation projects in 1916—Continued.

State and project.	Miscellaneous.						Duplicated areas.	Total cropped areas.	Irrigated, no crop.					Total irrigated acreage.
	Beets, sugar.	Cotton.	Cotton seed.	Cane.	Other.	Total.			Young alfalfa.	Young fruit.	Fall plowing.	Miscellaneous.	Duplicated.	
Arizona: Salt River	.....	6,033	.....	.....	55	6,088	39,477	173,359	.....	1,298	.....	[1]13,148	.....	187,905
Arizona-California: Yuma	.....	4,670	4,670	.....	.....	9,340	17,316	28,283	.....	.....	.....	1,200	.....	29,483
California: Orland	.....	.....	.....	.....	27	27	3,204	7,011	618	1,343	.....	385	.....	9,357
Colorado:														
Grand Valley	113	.....	.....	.....	18	131	144	1,561	121	66	344	.....	351	1,741
Uncompahgre	2,023	.....	.....	.....	151	2,174	1,124	48,352	2,483	645	1,938	22	4,167	49,273
Idaho:														
Boise	16	.....	.....	.....	122	138	5,811	72,581	7,974	4,100	796	3,812	12,341	76,922
Minidoka—														
Gravity unit	3,225	.....	.....	.....	790	4,015	.....	44,365	4,504	840	813	557	1,822	49,257
South Side pumping unit	3,135	.....	.....	.....	.....	3,135	84	36,997	1,340	333	432	2,271	730	40,643
Montana:														
Huntley	5,264	.....	.....	3	159	5,426	.....	18,581	.....	17	.....	36	.....	18,634
Milk River	.....	.....	.....	.....	.....	.....	165	4,592	479	.....	447	.....	.....	5,518
Sun River [2]	81	.....	.....	.....	.....	81	.....	[2]6,425	.....	.....	.....	10	.....	[2]4,717
Montana-North Dakota: Lower Yellowstone	.....	.....	.....	.....	3	3	79	6,020	.....	.....	.....	.....	.....	6,020
Nebraska-Wyoming: North Platte	9,024	.....	.....	.....	327	9,351	.....	74,766	5,791	.....	.....	.....	4,937	75,620
Nevada: Truckee-Carson	.....	.....	.....	.....	.....	.....	694	38,249	.....	.....	.....	1,200	.....	39,449
New Mexico:														
Carlsbad	.....	2,721	2,721	794	.....	6,236	7,616	14,500	45	.....	.....	2,401	346	16,600
Hondo	.....	.....	.....	145	.....	145	11	1,219	41	64	.....	.....	.....	1,324
New Mexico-Texas: Rio Grande	103	.....	.....	.....	.....	103	2,082	61,818	.....	.....	.....	695	.....	62,513
Oregon: Umatilla	.....	.....	.....	.....	62	62	435	3,900	567	725	59	248	22	5,477
Oregon-California: Klamath	.....	.....	.....	.....	.....	.....	.....	29,351	.....	.....	.....	.....	.....	29,351
South Dakota: Belle Fourche	161	.....	.....	.....	176	337	3,358	46,909	1,681	78	.....	.....	200	48,468
Utah: Strawberry Valley	5,298	.....	.....	3	.....	5,301	.....	25,066	.....	.....	.....	5,656	.....	30,722
Washington:														
Okanogan	.....	.....	.....	.....	1	1	971	5,242	206	1,831	.....	814	243	7,850
Yakima—														
Sunnyside unit	.....	.....	.....	.....	[3]164	164	6,410	59,449	3,371	2,267	.....	10,349	2,436	73,000
Tieton unit	.....	.....	.....	.....	[3]346	346	2,590	21,000	1,234	3,645	129	200	3,208	23,000
Wyoming: Shoshone	885	.....	.....	.....	.....	885	.....	28,695	2,379	173	241	276	1,787	29,977
Total for irrigated areas covered by crop reports	29,328	13,424	7,391	945	2,401	53,489	91,571	858,291	32,834	17,425	5,199	[1]43,380	32,590	922,821

[1] Includes 10,379 acres in Salt River project for which water was bought, but no crop reported; probably largely in pasture.
[2] Crop reports covered 158 irrigated farms, which produce some crops without irrigation.
[3] Hops.

Total yields of irrigated crops on reclamation projects in 1916.[1]

State and project.	Cereals.						Other grain and seed.						Hay and forage.				
	Barley.	Corn, Indian	Oats.	Rye.	Wheat.	Total.	Alfalfa seed.	Clover seed.	Grain sorghum.	Flax-seed.	Millet seed.	Total.	Alfalfa hay.	Clover hay.	Other hay.	Corn fodder	Peas, bush.
	Bushels.	*Bushels.*	*Bushels.*	*Bush.*	*Bushels.*	*Bushels.*	*Bush.*	*Bush.*	*Bushels.*	*Bush.*	*Bush.*	*Bushels.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Arizona: Salt River	332,375	34,440	57,000	.....	252,025	675,840	10,956	.....	.....	.....	.....	10,956	326,464	.....	12,122	16,640	.....
Arizona-California: Yuma	28,086	1,875	.....	.....	7,220	37,181	43,930	.....	195,799	.....	.....	239,729	28,029	.....	1,075	.....	.....
California: Orland	.....	.....	.....	.....	.....	.....	.....	.....	25,370	.....	.....	25,370	29,058	.....	214	.....	.....
Colorado:																	
Grand Valley	497	2,231	6,150	.....	6,259	15,137	16	.....	.....	.....	.....	16	323	.....	.....	160	7
Uncompahgre	14,120	67,118	218,456	343	235,616	535,653	1,592	12	.....	.....	.....	1,604	50,341	301	747	4,329	840
Idaho:																	
Boise	119,900	111,905	145,050	1,299	441,959	820,113	2,018	22,861	.....	.....	248	25,127	117,233	13,571	982	1,160	355
Minnidoka—																	
Gravity unit	46,699	2,295	103,164	1,275	85,608	239,041	2,689	2,652	.....	.....	293	5,634	77,445	1,643	518	41	5,125
South Side pumping unit	24,413	415	66,697	87	143,246	234,858	810	5,017	.....	.....	.....	5,827	47,811	815	178	33	2,828
Montana:																	
Huntley	2,239	1,733	37,795	.....	31,161	72,928	32	30	.....	.....	.....	62	14,411	32	299	78	.....
Milk River	2,350	1,000	8,054	.....	11,720	23,124	.....	.....	.....	626	.....	626	3,399	.....	1,709	.....	.....
Sun River[2]	2,853	.....	12,245	.....	14,339	29,437	.....	20	.....	15	36	71	6,262	.....	222	.....	.....
Montana-North Dakota: Lower Yellowstone	9,843	1,300	14,627	.....	17,202	42,972	12	35	.....	1,947	.....	1,994	7,574	.....	158	80	.....
Nebraska-Wyoming: North Platte	106,096	125,911	191,204	1,012	28,207	452,430	797	.....	.....	.....	2,305	3,102	59,706	.....	656	291	.....
Nevada: Truckee-Carson	52,000	.....	4,562	.....	57,733	114,295	.....	.....	.....	.....	.....	.....	62,095	.....	1,057	.....	.....
New Mexico:																	
Carlsbad	2,456	8,669	21,560	.....	22,921	55,606	8,897	.....	9,660	.....	.....	18,557	12,343	.....	59	.....	.....
Hondo	300	1,550	700	.....	.....	2,550	.....	.....	.....	.....	.....	.....	1,432	.....	85	527	.....
New Mexico-Texas: Rio Grande	49,808	181,566	73,035	40	215,705	520,154	3,873	.....	14,060	.....	1,750	19,683	94,405	.....	423	10,032	54
Oregon: Umatilla	.....	2,753	.....	.....	.....	2,753	26	250	.....	.....	.....	276	11,412	5	100	322	.....
Oregon-California: Klamath	168,680	.....	62,347	10,765	18,802	260,594	.....	.....	.....	.....	.....	.....	17,720	.....	3,353	.....	.....
South Dakota: Belle Fourche	42,804	75,588	91,767	1,392	38,222	249,773	5,320	.....	.....	2,276	305	7,901	36,765	78	1,749	733	.....
Utah: Strawberry Valley	26,305	2,175	76,517	722	132,209	237,928	52	.....	.....	.....	.....	52	23,009	.....	2,002	.....	.....
Washington:																	
Okanogan	.....	2,519	.....	.....	60	2,579	.....	.....	.....	.....	.....	.....	4,171	171	379	142	.....
Yakima—																	
Sunnyside unit	25,001	390,867	3,920	.....	20,260	440,048	.....	.....	.....	.....	.....	.....	135,917	164	5,002	5,460	.....
Tieton unit	27,300	54,460	69,310	.....	69,100	220,170	.....	195	.....	.....	.....	195	27,223	618	1,675	2,013	6
Wyoming: Shoshone	10,783	.....	223,359	100	52,831	287,073	252	1,009	.....	.....	24	1,285	30,702	31	252	326	.....
Totals for area covered by crop reports	1,094,908	1,070,370	1,487,519	17,035	1,902,405	5,572,237	81,272	32,081	244,889	4,864	4,961	368,067	1,225,250	17,429	35,016	42,367	9,215

[1] Data are for calendar year (irrigation season), except on Salt River project, Arizona, data are for corresponding agricultural year ending Nov. 30, 1916. Figures are restricted to irrigating areas covered by crop reports, excluding about 100,000 acres, irrigated but not covered by crop reports and small areas cropped by dry farming on a few projects except as noted for the Sun River project, Montana.

[2] Crop reports covered 158 irrigated farms, which produced some crops without irrigation.

Total yields of irrigated crops on reclamation projects in 1916—Continued.

State and project.	Vegetables.				Fruits and nuts.								Miscellaneous.		
	Beans.	Onions	Potatoes, white.	Potatoes, sweet.	Apples.	Peaches.	Pears.	Prunes.	Citrus fruit.	Small fruit.	Other.	Total.	Beets, sugar.	Cotton.	Cane.
	Bush.	*Bush.*	*Bushels.*	*Bush.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds*	*Pounds.*	*Tons.*	*Pounds.*	*Tons.*
Arizona: Salt River	14,200	.....	21,060	7,650	.....	.....	.....	.....	2,518,000	1,492,400	.....	[1] 9,002,400	.....	2,111,550	.....
Arizona-California: Yuma	2,428	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	[2] 200,000	.....	2,289,430	.....
California: Orland	.....	.....	.....	.....	.....	.....	.....	80,000	408,160	[3] 22,000	98,933	[4] 849,093	.....	.....	.....
Colorado:															
Grand Valley	121	.....	2,367	.....	1,124,229	55,758	216,313	.....	.....	2,205	.....	1,398,505	956	.....	.....
Uncompahgre	3,781	87,730	756,624	.....	1,087,100	875	16,600	3,250	.....	57,750	.....	1,165,575	22,635	.....	.....
Idaho:															
Boise	1,712	90	161,300	141	14,310	98,725	150	.....	.....	54,492	.....	167,677	87	.....	.....
Minnidoka—															
Gravity unit	499	1,902	203,990	.....	.....	.....	.....	.....	.....	4,315	.....	4,315	37,706	.....	.....
South Side pumping plant	102	.....	256,713	.....	.....	.....	.....	.....	.....	.....	.....	.....	33,248	.....	.....
Montana:															
Huntley	.....	.....	5,155	.....	.....	.....	.....	.....	.....	[3] 5,000	.....	5,000	42,106	.....	5
Milk River	.....	.....	1,432	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sun River [5]	.....	.....	10,252	.....	.....	.....	.....	.....	.....	.....	.....	.....	467	.....	.....
Montana-North Dakota: Lower Yellowstone	18	.....	5,468	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nebraska-Wyoming: North Platte	2,268	.....	274,100	.....	.....	.....	.....	.....	.....	.....	.....	.....	92,104	.....	.....
Nevada: Truckee-Carson	.....	.....	29,400	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Mexico:															
Carlsbad	12	.....	.....	700	.....	124,023	.....	.....	.....	.....	.....	124,023	.....	574,834	1,953
Hondo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	264
New Mexico-Texas: Rio Grande	16,418	1,360	.....	19,210	3,090,000	2,242,000	6,150,000	.....	.....	206,000	.....	11,688,000	721	.....	.....
Oregon: Umatilla	.....	342	3,234	.....	310,262	.....	.....	.....	.....	[3] 50,000	.....	360,262	.....	.....	.....
Oregon-California: Klamath	.....	.....	2,604	.....	.....	.....	.....	.....	.....	.....	.....	[2] 10,000	.....	.....	.....
South Dakota: Belle Fourche	191	4	14,002	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,515	.....	.....
Utah: Strawberry Valley	183	.....	25,401	.....	.....	.....	.....	.....	.....	.....	.....	[2] 200,000	65,201	.....	[3] 20
Washington:															
Okanogan	45	270	6,821	.....	9,667,520	434,800	124,400	11,080	.....	84,783	125,367	10,447,950	.....	.....	.....
Yakima—															
Sunnyside unit	1,950	.....	841,600	.....	51,202,650	5,850,280	9,799,200	2,298,825	[3] 200,000	[3] 900,000	.....	70,250,955	.....	.....	.....
Tieton unit	2,240	4,160	196,500	.....	12,162,250	2,147,500	1,512,000	3,050	.....	34,550	.....	15,859,350	.....	.....	.....
Wyoming: Shoshone	159	.....	40,489	.....	2,255	.....	.....	.....	.....	850	.....	3,105	9,850	.....	.....
Total for areas covered by crop reports	46,327	95,858	2,858,512	27,701	78,660,576	10,953,961	17,818,663	2,396,205	3,126,160	2,914,345	224,300	121,736,210	306,596	4,975,814	2,242

[1] Includes 1,992,000 pounds deciduous fruits not listed separately.
[2] Estimated: not reported under separate fruits.
[3] Estimated.
[4] Includes 240,000 pounds deciduous fruit not listed separately.
[5] Crop reports covered 158 irrigated farms, which produced some crops without irrigation.

Total value of irrigated crops harvested on reclamation projects in 1916.[1]

State and project.	Cereals.						Other grain and seed.					
	Barley.	Corn, Indian.	Oats.	Rye.	Wheat.	Total.	Alfalfa seed.	Clover seed.	Grain sorghum.	Flax-seed.	Millet seed.	Total.
Arizona, Salt River	$348,994	$34,440	$28,500	.....	$289,829	$701,763	$78,883	.....	.....	.....	.....	$78,883
Arizona-California, Yuma	19,433	1,345	.....	.....	10,032	30,810	328,725	.....	$124,915	.....	.....	453,640
California, Orland	.....	.....	.....	.....	.....	.....	.....	.....	25,363	.....	.....	25,363
Colorado:												
Grand Valley	502	2,386	3,597	.....	8,405	14,890	112	.....	.....	.....	.....	112
Uncompahgre	14,294	58,065	120,927	$399	301,763	495,448	16,122	$54	.....	.....	.....	16,176
Idaho:												
Boise	86,328	111,905	87,030	1,299	574,547	861,109	14,631	213,077	.....	.....	$310	228,018
Minidoka—												
Gravity unit	39,750	2,305	62,076	1,530	97,606	203,267	16,131	22,206	.....	.....	408	38,745
South side pumping unit	20,751	415	40,018	104	171,895	233,183	4,860	45,153	.....	.....	.....	50,013
Montana:												
Huntley	2,068	1,497	23,651	.....	45,529	72,745	306	274	.....	.....	36	616
Milk River	1,692	750	4,027	.....	19,924	26,393	.....	.....	.....	$1,565	.....	1,565
Sun River	2,140	.....	6,735	.....	20,075	28,950	.....	240	.....	30	36	306
Montana-North Dakota, Lower Yellowstone	7,776	910	6,584	.....	27,523	42,793	168	525	.....	4,575	.....	5,268
Nebraska-Wyoming, North Platte	63,658	88,138	95,602	911	33,848	282,157	7,173	.....	.....	.....	2,305	9,478
Nevada, Truckee-Carson	49,920	.....	2,920	.....	77,940	130,780	.....	.....	.....	.....	.....	.....
New Mexico:												
Carlsbad	2,311	8,833	14,430	.....	17,911	43,485	58,985	.....	8,454	.....	.....	67,439
Hondo	225	1,550	420	.....	.....	2,195	.....	.....	.....	.....	.....	.....
New Mexico-Texas, Rio Grande	59,770	217,879	54,776	120	323,557	656,102	27,886	.....	16,872	.....	1,050	45,808
Oregon, Umatilla	.....	2,753	.....	.....	.....	2,753	386	2,700	.....	.....	.....	3,086
Oregon-California, Klamath	151,812	.....	37,408	12,918	25,383	227,521	.....	.....	.....	.....	.....	.....
South Dakota, Belle Fourche	29,963	60,470	36,707	1,392	47,778	176,310	42,560	.....	.....	4,552	305	47,417
Utah, Strawberry Valley	32,881	2,175	42,084	650	237,886	315,676	468	.....	.....	.....	.....	468
Washington:												
Okanogan	.....	1,889	.....	.....	60	1,949	.....	.....	.....	.....	.....	.....
Yakima—												
Sunnyside unit	20,001	312,694	2,352	.....	23,383	358,430	.....	.....	.....	.....	.....	.....
Tieton unit	23,205	46,291	31,189	.....	82,920	183,605	.....	2,340	.....	.....	.....	2,340
Wyoming, Shoshone	9,705	.....	134,016	100	52,831	196,652	2,268	9,081	.....	.....	96	11,445
Total for irrigated areas covered by crop reports	987,179	956,690	835,049	19,423	2,490,625	5,288,966	599,664	295,650	175,604	10,722	4,546	1,086,186

[1] Data are for calendar year (irrigation season) except on Salt River project. Arizona, data are for corresponding agricultural year ending Nov. 30, 1916. Figures are restricted to irrigated areas covered by crop reports, excluding about 100,000 acres irrigated, but not covered by crop reports, and small areas cropped by dry farming on a few projects, except as noted for Sun River project, Montana. All figures are intended to show the value received by the farmer for his crops, whether sold on the farm or in town, with or without baling, boxing, etc. If fed by the farmer, the crop is given a value representing the average selling price on the farm.

Total value of irrigated crops harvested on reclamation projects in 1916—Continued.

State and project.	Hay and forage.								Vegetables and truck.					
	Alfalfa hay.	Clover hay.	Other hay.	Corn fodder.	Peas.	Other forage.	Pasture.	Total.	Beans.	Onions.	Potatoes, white.	Potatoes, sweet.	Truck.	Total.
Arizona, Salt River	$3,917,568	.....	$145,464	$83,200	.....	$1,089,948	$950,796	$6,186,976	$51,120	.....	$31,590	$11,475	$331,340	$425,523
Arizona-California, Yuma	266,898	.....	10,383	.....	.....	19,289	82,643	379,213	10,215	.....	.....	.....	25,038	35,253
California, Orland	219,906	.....	2,576	.....	.....	.....	26,628	249,110	.....	.....	.....	.....	22,288	22,288
Colorado:														
Grand Valley	3,929	.....	.....	853	$20	.....	168	4,970	662	.....	3,089	.....	1,392	5,143
Uncompahgre	368,685	$2,107	5,585	14,716	1,146	6,090	18,632	416,961	15,976	$97,073	733,923	.....	9,369	856,341
Idaho:														
Boise	879,247	81,426	4,419	2,320	852	30	63,697	1,031,991	10,272	76	145,170	423	31,198	187,139
Minidoka—														
Gravity unit	770,264	16,397	4,656	246	9,545	7,870	56,791	865,769	1,532	2,378	183,480	.....	24,541	211,931
South side pumping unit	478,110	8,150	2,670	198	5,091	.....	44,713	538,932	306	.....	231,042	.....	12,903	244,231
Montana:														
Huntley	129,263	352	4,407	416	.....	.....	8,867	143,305	.....	.....	5,889	.....	9,927	15,816
Milk River	23,793	.....	13,672	.....	.....	.....	1,160	38,625	.....	.....	1,718	.....	1,715	3,433
Sun River	62,617	.....	2,530	.....	.....	.....	3,834	68,981	.....	.....	15,378	.....	3,037	18,415
Montana-North Dakota, Lower Yellowstone	64,758	.....	1,185	640	.....	.....	1,025	67,608	151	.....	5,085	.....	3,300	8,536
Nebraska-Wyoming, North Platte	447,795	.....	5,248	378	.....	4,628	38,710	496,759	13,608	.....	246,690	.....	7,211	267,509
Nevada, Truckee-Carson	558,855	.....	8,128	.....	.....	.....	30,207	597,190	.....	.....	35,280	.....	28,196	63,476
New Mexico:														
Carlsbad	140,301	.....	499	.....	.....	.....	19,818	160,618	59	.....	.....	995	2,091	3,145
Hondo	20,101	.....	830	5,171	.....	1,050	.....	27,152	.....	.....	.....	.....	300	300
New Mexico-Texas, Rio Grande	1,510,480	.....	6,345	30,096	324	.....	20,587	1,567,832	68,956	3,060	.....	14,407	214,230	300,653
Oregon, Umatilla	109,555	55	913	1,462	.....	.....	4,023	116,008	.....	352	2,975	.....	4,180	7,507
Oregon-California, Klamath	222,640	.....	33,530	.....	.....	.....	17,973	274,143	.....	.....	3,515	.....	4,680	8,195
South Dakota, Belle Fourche	257,355	624	16,615	3,665	.....	.....	27,826	306,085	573	4	14,002	.....	5,080	19,659
Utah, Strawberry Valley	437,171	.....	8,044	.....	.....	.....	34,885	480,100	880	.....	63,502	.....	28,745	93,127
Washington:														
Okanogan	41,715	2,046	3,790	1,136	.....	580	192	49,459	218	405	6,139	.....	10,815	17,577
Yakima—														
Sunnyside unit	1,495,087	1,968	50,020	27,300	.....	81,177	55,575	1,711,127	7,098	.....	732,192	.....	95,100	834,390
Tieton unit	285,841	6,180	15,075	8,052	36	416	21,200	336,800	8,064	7,280	147,375	.....	26,630	189,349
Wyoming, Shoshone	245,616	157	1,859	2,612	.....	.....	19,686	269,930	574	.....	40,489	.....	16,605	57,668
Total for irrigated areas covered by crop reports	12,957,550	119,462	348,443	182,461	17,014	1,211,078	1,549,636	16,385,644	190,264	110,628	2,648,523	27,300	919,911	3,896,626

State and project.	Fruit and nuts.								Miscellaneous.					Total.
	Apples.	Peaches.	Pears.	Prunes.	Citrus fruit.	Small fruit.	Other.	Total.	Beets, sugar.	Cotton and cotton seed.	Cane.	Other.	Total.	
Arizona, Salt River	.....	.....	.....	.....	$125,900	$84,420	.....	[1] $335,120	.....	$704,014	.....	$3,438	$707,452	$8,435,719
Arizona-California, Yuma	.....	.....	.....	.....	.....	.....	.....	[2] 4,440	.....	467,697	.....	64,350	532,047	1,435,403
California, Orland	.....	.....	.....	$4,000	10,204	650	$16,324	[3] 34,778	.....	.....	.....	10,800	10,800	342,339
Colorado:														
Grand Valley	$15,919	$1,670	$5,590	.....	.....	104	.....	23,283	$5,800	.....	.....	494	6,294	54,692
Uncompahgre	17,439	26	642	65	.....	4,317	.....	22,489	133,850	.....	.....	8,264	142,114	1,949,529
Idaho:														
Boise	429	4,936	9	.....	.....	2,725	.....	8,099	522	.....	.....	10,616	11,138	2,327,494
Minidoka—														
Gravity unit	.....	.....	.....	.....	.....	522	.....	522	216,644	.....	.....	6,000	222,644	1,542,878
South side pumping unit	.....	.....	.....	.....	.....	.....	.....	.....	191,176	.....	.....	.....	191,176	1,257,555
Montana:														
Huntley	.....	.....	.....	.....	.....	299	.....	299	255,826	.....	$50	414	256,290	489,071
Milk River	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	70,016
Sun River	.....	.....	.....	.....	.....	.....	.....	.....	2,338	.....	.....	.....	2,338	118,990
Montana-North Dakota, Lower Yellowstone	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	381	381	124,586
Nebraska-Wyoming, North Platte	.....	.....	.....	.....	.....	.....	.....	.....	575,650	.....	.....	1,837	577,487	1,633,390
Nevada, Truckee-Carson	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	791,446
New Mexico:														
Carlsbad	.....	3,979	.....	.....	.....	.....	.....	3,979	.....	120,822	16,553	.....	137,375	416,401
Hondo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,553	.....	2,553	32,200
New Mexico-Texas, Rio Grande	61,800	67,260	184,500	.....	.....	6,180	.....	319,740	3,605	.....	.....	.....	3,605	2,893,740
Oregon, Umatilla	7,136	.....	.....	.....	.....	1,398	.....	8,534	.....	.....	.....	1,913	1,913	139,800
Oregon-California, Klamath	.....	.....	.....	.....	.....	.....	.....	[3] 6	.....	.....	.....	.....	.....	509,865
South Dakota, Belle Fourche	.....	.....	.....	.....	.....	.....	.....	.....	6,818	.....	.....	1,030	7,848	557,319
Utah, Strawberry Valley	.....	.....	.....	.....	.....	.....	.....	[3] 6,362	424,207	.....	195	.....	424,402	1,320,135
Washington:														
Okanogan	241,688	7,609	3,110	277	.....	2,543	3,761	258,988	.....	.....	.....	412	412	328,385
Yakima—														
Sunnyside unit	921,648	131,631	235,402	64,367	11,319	36,210	.....	1,400,577	.....	.....	.....	37,416	37,416	4,341,940
Tieton unit	243,245	42,950	45,360	122	.....	2,764	.....	334,441	.....	.....	.....	56,000	56,000	1,102,536
Wyoming, Shoshone	68	.....	.....	.....	.....	127	.....	195	65,013	.....	.....	.....	65,013	600,903
Total for irrigated areas covered by crop reports	1,509,372	260,061	474,613	68,831	147,423	142,259	20,085	2,761,852	1,881,449	1,292,533	19,351	203,365	3,396,698	32,815,972

[1] Includes deciduous fruit, $124,800, not listed under separate fruits. [2] Not reported under separate fruits. [3] Includes deciduous fruit, $3,600, not listed under separate fruits.

ACCOUNTING TERMINOLOGY.

Accounting.—The art or science of analyzing, classifying, recording, summarizing, and interpreting facts relating to the acquisition, production, transfer, and ownership of articles of wealth or value.

Accounts.—Systematic statements of financial facts of identical or opposite character, so arranged as to readily provide summaries or balances of the same.

Accruals of water-right charges.—The installments on account of construction or operation and maintenance charges which become due upon definite dates.

Advance payments of water-right charges.—The amounts paid by water users in excess of accruals.

Allotment.—As used in the Reclamation Service, an allotment is that part of an appropriation which is allotted by the Reclamation Commission to a project for expenditure.

Appropriation.—As used in Reclamation Service accounting, this represents the amount of money set aside by Congress from the reclamation fund to be used in the construction or operation and maintenance, or both, of a project.

Assets of a project.—The amount of money, or property expressed in terms of money, which the project owns or which is at its disposal.

Bookkeeping.—The mechanical operation of assembling financial data in books of record. (See *Accounts* and *Accounting.*)

Capital investment.—The group of accounts representing actual transactions in cash, or its equivalent. All money transactions and transactions in property and services expressed in terms of money, will be finally recorded in this group. The total "disbursements" less the total "collections" is the "net investment."

Charges, water-right.—See *Construction* and *Operation and maintenance charge.*

Clearing accounts.—Accounts for handling operating expenses incidental to the work, which can not be charged with reasonable accuracy direct to feature costs, and which are "cleared" in some more or less arbitrary manner at the close of stated periods.

Collections.—Moneys, or the equivalent thereof, received by the Government in liquidation of a debt due or to become due.

Commercial paper.—As used in reclamation accounting, commercial paper is synonymous with personal checks, bank drafts, post-office money orders, and like documents which are convertible directly into cash or its equivalent.

Construction cost.—See *Cost.*

Construction water-right charge.—A charge assessed against the irrigable area to cover the cost of construction of the irrigation system.

Controlling accounts.—Accounts established in the general ledger in which are summarized the transactions recorded and carried in subsidiary or auxiliary records.

Cost.—The *gross cost* of construction of a project is the value of services performed or property used, either directly or indirectly, in connection with the construction of the irrigation and auxiliary works of the project. It does not include the value of materials purchased and still in stock, but does include services and materials used, even though still unpaid and carried as liabilities. The *net cost* of construction of a project is its gross cost less the value of all revenues the occurrence or accrual of which is incidental to the work during the period of construction.

Depreciation.—The reduction of the original cost or value, due to deterioration by wear and tear or otherwise, of a structure, facility, or unit of equipment.

Detail cost accounts.—Classes or divisions of expense making up the cost of a physical feature.

Disbursement.—See *Expenditure.*

Equipment.—Equipment, or nonexpendable property, is property which neither loses its identity, becomes a permanent fixture, nor is immediately consumed when applied to its intended use.

Estimate.—As used in the Reclamation Service, an estimate is an opinion or calculation obtained from the best information at hand of the cost of doing a stated work and of the quantities of the several units of work contained therein.

Expenditure.—The payment or disbursement of cash, or its equivalent, when such act operates to deprive the payor of further use or control of the article or property thus disbursed. In theory, when the construction of a project is completed, all liabilities and obligations liquidated, and all cash, equipment, materials, and other like assets expended in the work, then the "total expenditures" and the "gross construction cost" of the project will be equal.

Funds.—The amount of money available for expenditure for a specified purpose.

Gross costs.—See *Costs.*

Inventory.—An itemized account, catalogue, or schedule of equipment, materials, supplies, or other property which is on hand and available for use.

Investment.—See *Capital investment.*

Invoice.—The vendor's statement of goods sold, containing items, unit prices, and value of merchandise delivered or to be delivered. In Reclamation accounting the term "invoice" must never be confused with "inventory."

Liabilities.—The amount of money, or of property or services expressed in terms of money, which the project owes, or is under obligation to pay, deliver, or render. (Repayment accounts are included in the project's liabilities for the reason that such accounts represent the amount of money which the project must return to the Government.)

Maintenance.—See *Operation and maintenance.*

Mercantile store.—The term used to designate buildings and contents where goods are kept for the purpose of sale, either for cash or coupons, or to be charged as deductions on pay rolls.

Mess house.—The term used to designate an eating place or dining room. It is improper to refer to such a place as a "commissary."

Nonexpendable property.—See *Equipment.*

Obligations.—See *Liabilities.*

Operation and maintenance.—"Operation" is the actual use of an irrigation system for the development and distribution of water, including works for drainage and flood protection to preserve the irrigated lands against excess water. "Maintenance" embraces the repairs and renewals necessary to preserve the irrigation and drainage system in its original efficiency.

Operation and maintenance water-right charge.—An annual charge assessed against the irrigable area to cover the cost of the operation and maintenance of the irrigation system.

Operation and maintenance year.—The irrigation year, usually the calendar year (Jan. 1 to Dec. 31, inclusive). On some southern projects the operation and maintenance year is arranged to accord with the irrigation season, but unless otherwise specified the term "Operation and maintenance year" is synonymous with calendar year.

Original entry.—The first record made of a charge or credit which becomes the basis of proof of the account.

Physical features.—The divisions of principal features for the purpose of collecting special costs on separate and distinct jobs or units or divisions of a project. They usually represent some tangible product when construction is completed, such as a canal, dam, bridge, etc.

Physical inventory.—The act of determining the quantity of equipment, materials, or supplies on hand by actual counting, weighing, or measuring each kind of property, and of making definite record thereof.

Plants or plant accounts.—As used in Reclamation accounting, these accounts are designed to receive all charges for the cost of original equipment and installation, with additions thereto, and also the cost of extraordinary repairs and of temporary plants erected to facilitate work on a project.

Posting.—The act of transferring amounts from a book or record of original entry to a ledger.

Principal features represent a general division of the project into primary parts or units; the nature or function of each feature is usually implied by its name, such as examination and survey, storage works, canal system, etc.

Property nonexpendable.—See *Equipment.*

Refund.—A reimbursement of an amount previously paid.

Register.—As used in Reclamation accounting, this is a journal which, by special ruling, is designed to facilitate the recording of accounting transactions. It is usually, but not always, a book of original entry.

Reimbursable accounts.—Those kept to record the results of operations not directly related to cost-ledger features; the cost of their maintenance is reimbursed by cash receipts or deductions from Service earnings.

Repair.—Replacement of some part of a structure, facility, or unit of equipment, made necessary through wear or other casualty, when such replacement does not amount to a substantial change of identity in such structure, facility, or unit of equipment.

Repayments.—Represent the sources from which the Government expects to secure reimbursement to the Reclamation fund.

Replacement.—The substitution, as a whole, for a structure, facility, or equipment, worn out or become inadequate in service, such substitution having no greater capacity than the thing for which it was substituted.

Resources.—See *Assets.*

Revenues.—Revenues are incidental to the construction or operation and maintenance of a project, and the accruals thereof tend to decrease the gross costs of the construction or operation and maintenance of the project as a whole.

Storehouses.—As distinguished from mercantile stores, storehouses are the buildings, bins, chutes, or yards in which Government property is stored, available for assignment to the work, or transfer to other storehouses or projects.

Supplemental construction.—The improvements of an irrigation or drainage system, or any part or structure thereof, of a completed project, or of a completed portion of a project, as to which the construction charges have been announced.

Water-right charges.—See *Construction* and *Operation and maintenance charge.*

FINANCIAL STATEMENTS.

ASSETS, LIABILITIES, RESERVES, AND CAPITAL, AND OPERATING EXPENSES AND REVENUES.

Assets, liabilities, reserves, and capital, Salt River project, to June 30, 1917.

ASSETS.

Cash:			
In employees' hands, awaiting transfer to special fiscal agents		$15.55	
Cash in special deposit account		5,102.88	
			$5,118.43
Inventory of stock on hand:			
Stores issued and not used		1,172.75	
Storehouse stock		44,730.86	
Cement		7,075.61	
Structural iron and steel		11,270.98	
Lumber		4,728.39	
Explosives		1,828.99	
Forage in stock		2,367.78	
Fuel		790.94	
Goods in transit		24,836.76	
Freight and handling on inventory property		[1] 78.89	
Equipment adjustment account		27,214.50	
			125,938.67
Accounts receivable:			
Construction charges unaccrued on contracts with water-right applicants		2,894,661.60	
Uncollected rentals of power and light		22.00	
Uncollected rentals of irrigation water		49,897.09	
Uncollected rentals of telephones and tolls		7,778.40	
Other uncollected items unclassified		13,682.52	
Unadjusted transfers to other projects		444.04	
			2,966,485.65
Construction work contracted: Estimated engineering expenses on construction work contracted			42,823.00
Construction work in process:			
Gross cost of construction of project to date	$12,077,325.17		
Gross supplemental construction cost of project to date	2,324,682.26		
Plant accounts	39,453.31		
Unadjusted clearing accounts	[1] 586.27		
		14,440,874.47	
Less revenues earned during construction, as follows—			
Rentals of buildings	19,527.88		
Rentals of grazing and farming lands	19,316.14		
Rentals of power and light (net revenue)	642,437.61		
Rentals of irrigation water (net revenue)	1,988,989.73		
Contractors' freight refunds	21,180.85		
Forfeitures by defaulting bidders and contractors	7,816.30		
Other revenues, unclassified	160,412.11		

Construction work in process—Continued.			
Less cost adjustments—			
Joint construction of power plants	$714,777.37		
Profit on mess-house operations	18,261.09		
Profit on mercantile store operations	2,515.31		
Profit on hospital operations	1,437.64		
Livestock	[1] 1,156.49		
Amount set up as reserves or depreciation, charged to construction and not expended	392,517.26		
Total deductions		$3,988,032.80	
Net cost of construction of project to date			$10,452,841.67
Total assets			13,593,207.42

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid contract holdbacks		$421.00	
Unpaid labor		12,271.60	
Unpaid purchases		25,624.02	
Unpaid freight and express charges		10,485.24	
Unpaid passenger fares		290.00	
Unpaid agreements to purchase real property		602.45	
Other unpaid items unclassified		49,630.62	
			$99,324.93
Contingent obligations:			
Unearned value of construction work contracted		42,823.00	
Guarantee and special deposits		5,102.88	
			47,925.88
Reserves for repayment to reclamation fund of cost of project:			
Value of construction contracts with water-right applicants		2,894,661.60	
Construction charges paid in advance by water-right applicants		52,269.00	
			2,946,930.60
Capital investment:			
Disbursement vouchers	$14,012,725.37		
Joint construction vouchers received	921,510.35		
Transfer vouchers received from other projects	474,871.32		
		15,409,107.04	
Less—			
Collections	3,921,851.03		
Joint construction vouchers issued	921,510.35		
Transfer vouchers issued to other projects	66,719.65		
		4,910,081.03	
			10,499,026.01
Total liabilities, reserves, and capital investments of the Government			13,593,207.42

[1] Deduct.

Assets, liabilities, reserves, and capital, Yuma project, to June 30, 1917.

ASSETS.

Inventory of stock on hand:			
Storehouse stock		$45,631.87	
Cement		491.77	
Lumber		8,109.78	
Explosives		2,523.82	
Forage in stock		1,189.79	
Fuel		1,306.58	
Goods in transit		942.43	
Freight and handling on inventory property		488.69	
			$60,684.73
Accounts receivable:			
Construction charges due and uncollected from water-right applicants		132,590.67	
Construction charges unaccrued on contracts with water-right applicants		478,680.45	
Operation and maintenance charges due and uncollected from water-right applicants		20,866.23	
Uncollected rentals of irrigation water		6,655.98	
Other uncollected items unclassified		7,573.92	
			646,367.25
Construction work in process:			
Gross cost of construction of project to date	$8,186,203.88		
Gross operation and maintenance cost during construction	664,352.62		
Plant accounts	200,910.18		
Unadjusted clearing accounts	527.18		
		9,051,993.86	
Less revenues earned during construction, as follows—			
Rentals of buildings	5,914.06		
Rentals of grazing and farming lands	593.00		
Rentals of irrigation water	321,150.89		
Contractors' freight refunds	18,505.86		
Forfeitures by defaulting bidders and contractors	1,060.00		
Other revenues, unclassified	6,033.95		
Less cost adjustments—			
Loss on mess-house operations	[1] 1,458.48		
Profit on mercantile-store operations	66,606.97		
Profit on hospital operations	[1] 1,144.99		
Loss on railroad operations	[1] 1,862.71		
Total deductions		415,398.55	
Net cost of construction of project to date			8,636,595.31
Operation and maintenance deficit			125,674.81
Total assets			9,469,322.10

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid labor		$26,133.52	
Unpaid purchases		11,044.27	
Unpaid freight and express charges		16,744.89	
Unpaid passenger fares		498.95	
Unredeemed coupon books		383.50	
Unredeemed meal tickets		527.95	
Unadjusted transfers from other projects		6,700.00	
			-62,033.08

[1] Deduct.

Reserves for repayment to reclamation fund of cost of project:			
Value of construction contracts with water-right applicants		$885,470.96	
Construction charges paid in advance by water-right applicants		300.00	
Construction charges paid and forfeited by water-right applicants		2,113.08	
Penalties paid on construction charges by water-right applicants		361.84	
			$888,245.88
Capital investment:			
Disbursement vouchers	$9,180,085.43		
Transfer vouchers received from other projects	284,496.92		
		9,464,582.35	
Less—			
Collections	850,161.89		
Transfer vouchers issued to other projects	95,377.32		
Net investment		945,539.21	
			8,519,043.14
Total liabilities, reserves, and capital investments of the Government			9,469,322.10

Operating expenses and revenues, Yuma project, to June 30, 1917.

EXPENSES.

Feature.	Fiscal year 1917.			To end of fiscal year 1917.		
	Operation.	Maintenance.	Total.	Operation.	Maintenance.	Total.
Canal system	$1,684.16	$1,382.71	$3,066.87	$7,595.47	$40,933.87	$48,529.34
Lateral system:						
Bard unit	4,711.04	8,846.17	13,557.21	46,269.48	80,372.66	126,642.14
Indian unit	3,344.71	7,978.15	11,322.86	10,575.80	24,561.70	35,137.50
	8,055.75	16,824.32	24,880.07	56,845.28	104,934.36	161,779.64
Drainage system	1,881.41	5,107.30	6,988.71	7,439.58	13,527.24	20,966.82
Total	11,621.32	23,314.33	34,935.65	71,880.33	159,395.47	231,275.80

REVENUES.

Item.	Fiscal year 1917.	To end of fiscal year 1917.
Operation and maintenance charges accrued on contracts with water-right applicants	$28,845.19	$99,503.33
Operation and maintenance charges paid and forfeited by water-right applicants	536.30	787.30
Penalties on operation and maintenance charges accrued on contracts, water-right applicants	364.12	364.12
Discount allowed on operation and maintenance charges accrued on contracts with water-right applicants	[1] 169.56	[1] 210.00
Rental of land and buildings during operating period	1,084.60	4,138.74
Rental of grazing and farming lands during operating period	120.00	984.00
Other revenues unclassified, earned during operating period	29.50	33.50
Total	30,810.15	105,600.99
Difference (deficit)	4,125.50	125,674.81

[1] Deduct.

Assets, liabilities, reserves, and capital, Orland project, to June 30, 1917.

ASSETS.

Inventory of stock on hand:			
Storehouse stock		$1,077.06	
Cement		1,031.24	
Structural iron and steel		101.42	
Lumber		296.70	
Explosives		7.04	
Forage in stock		115.43	
Fuel		61.26	
Products of local operations		103.56	
Freight and handling on inventory property		94.37	
			$2,888.08
Accounts receivable:			
Construction charges unaccrued on contracts with water-right applicants		720,696.95	
Uncollected rentals of irrigation water		270.00	
Other uncollected items unclassified		495.77	
			721,462.72
Construction work in process:			
Gross cost of construction of project to date	$898,081.22		
Gross operation and maintenance cost during construction	112,281.66		
Gross cost of producing commercial power during construction, equipment	17.79		
Plant accounts	964.39		
		1,011,345.06	
Less revenues earned during construction, as follows:			
Rentals of buildings	1,054.00		
Rentals of grazing and farming lands	3,568.00		
Rentals of irrigation water	119,090.22		
Contractors' freight refunds	1,829.82		
Forfeitures by defaulting bidders and contractors	2,115.00		
Other revenues, unclassified	1,953.47		
Less cost adjustments:			
Profit on mess house operations	14.97		
Profit on hospital operations	574.98		
Total deductions		130,200.46	
Net cost of construction o f project to date			881,144.60
Operation and maintenance deficit			11,479.27
Total assets			1,616,974.67

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid labor		$2,100.71	
Unpaid purchases		731.04	
Unpaid freight and express charges		129.32	
Unpaid passenger fares		10.85	
Unpaid agreements to purchase real property		5.00	
			$2,976.92
Reserves for repayment to reclamation fund of cost or project:			
Value of construction contracts with water-right applicants		735,405.00	
Construction charges paid in advance by water-right applicants		3,079.61	
			738,484.61

Capital investment:			
Disbursement vouchers	$980,584.26		
Transfer vouchers received from other projects	52,482.96		
		$1,033,067.22	
Less:			
Collections	152,298.93		
Transfer vouchers issued to other projects	5,255.15		
		157,554.08	
Net investment			$875,513.14
Total liabilities, reserves, and capital investments of the Government			1,616,974.67

Operating expenses and revenues, Orland project, to June 30, 1917.

EXPENSES.

Feature.	Fiscal year 1917.			To end of fiscal year 1917.		
	Operation.	Maintenance.	Total.	Operation.	Maintenance.	Total.
Storage works:						
East Park Dam	$1,070.89	$794.88	$1,865.77	$1,070.89	$794.88	$1,865.77
East Park Feed Canal	446.46	63.18	509.64	446.46	63.18	509.64
	1,517.35	858.06	2,375.41	1,517.35	858.06	2,375.41
Canal system:						
North diversion	.....	22.75	22.75	.....	22.75	22.75
South diversion	.....	63.23	63.23	.....	63.23	63.23
	.....	85.98	85.98	.....	85.98	85.98
Lateral system:						
North side	1,456.09	1,871.24	3,327.33	1,456.09	1,871.24	3,327.33
South side	3,029.62	3,090.48	6,120.10	3,029.62	3,090.48	6,120.10
	4,485.71	4,961.72	9,447.43	4,485.71	4,961.72	9,447.43
Undistributed expenses: Farm operations	137.80	.....	137.80	137.80	.....	137.80
Total	6,140.86	5,905.76	12,046.62	6,140.86	5,905.76	12,046.62

REVENUES.

Item.	Fiscal year 1917.	To end of fiscal year 1917.
Rental of land and buildings during operating period	$120.00	$120.00
Rentals of irrigation water	270.00	270.00
Other revenues unclassified, earned during operating period	177.35	177.35
Total	567.35	567.35
Difference (deficit)	11,479.27	11,479.27

Assets, liabilities, reserves, and capital, Grand Valley project, to June 30, 1917.

ASSETS.

Cash:		
In special fiscal agent's possession, awaiting remittance	$154.90	
In other employees' hands, awaiting transfer to special fiscal agents	9.35	
Cash in special deposit account	416.56	
		$580.81

Inventory of stock on hand:			
Stores issued and not used		$973.51	
Storehouse stock		16,157.60	
Cement		195.47	
Structural iron and steel		182.24	
Lumber		7,120.65	
Explosives		35.87	
Forage in stock		1,324.66	
Fuel		140.03	
Goods in transit		3,655.94	
Products of local operations		4,365.18	
Freight and handling on inventory property		815.71	
Equipment adjustment		743.76	
			$35,710.62
Accounts receivable:			
Uncollected rentals of grazing and farming lands		20.00	
Uncollected freight refunds		1,522.64	
Other uncollected items unclassified		7.50	
			1,550.14
Construction work contracted:			
Unearned value of construction work contracted		30,166.11	
Estimated engineering expenses on construction work contracted		83.58	
			30,249.69
Construction work in process:			
Gross cost of construction of project to date	$3,031,847.96		
Gross operation and maintenance cost during construction	33,955.41		
Gross cost of producing commercial power during construction	2,805.37		
Unadjusted clearing accounts	14,484.38		
		3,083,093.12	
Less revenues earned during construction, as follows—			
Rentals of buildings	1,765.07		
Rentals of grazing and farming lands	1,476.74		
Rentals of power and light	259.92		
Rentals of irrigation water	4,960.65		
Rentals of telephones and tolls	15.65		
Contractors' freight refunds	2,500.00		
Forfeitures by defaulting bidders and contractors	703.00		
Other revenues, unclassified	17.81		
Less cost adjustments—			
Profit—			
On mess-house operations	6,880.95		
On mercantile store operations	1,323.07		
On hospital operations	3,777.29		
Loss, farming operations	[1] 3,512.81		
Total deductions		20,167.34	
Net cost of construction of project to date			3,062,925.78
Total assets			3,131,017.04

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid progress earnings under construction contracts		$1,582.43	
Unpaid contract holdbacks		769.39	
Unpaid labor		8,210.91	
Unpaid purchases		6,613.52	
Unpaid freight and express charges		1,157.29	
Unpaid passenger fares		126.92	
Unpaid agreements to purchase real property		540.00	
			$19,000.46
Contingent obligations:			
Unearned value of construction work contracted		30,166.11	
Estimated engineering expenses on construction work contracted		83.58	
Guaranty and special deposits		416.56	
			30,666.25
Capital investment:			
Disbursement vouchers	$2,981,447.77		
Transfer vouchers received from other projects	144,986.63		
		3,126,434.40	
Less—			
Collections	33,565.57		
Transfer vouchers issued to other projects	11,518.50		
		45,084.07	
Net investment			3,081,350.33
Total liabilities, reserves, and capital investments of the Government			3,131,017.04

Assets, liabilities, reserves, and capital, Uncompahgre project, to June 30, 1917.

ASSETS.

Cash in special deposit account			$6.73
Inventory of stock on hand:			
Storehouse stock		$19,794.90	
Cement		1,416.65	
Lumber		7,739.11	
Explosives		59.11	
Fuel		436.00	
Goods in transit		2,738.15	
Freight and handling on inventory property		[1] 753.59	
			31,430.33
Accounts receivable:			
Uncollected rentals of irrigation water		298.00	
Other uncollected items unclassified		695.19	
Unadjusted transfers to other projects		225.00	
			1,218.19
Construction work contracted: Value of outstanding ditch systems			68,562.68
Construction work in process:			
Gross cost of construction of project to date	$6,164,500.42		
Gross operation and maintenance cost during construction	618,646.75		
Plant accounts	11,011.04		
		6,794,158.21	

[1] Deduct.

Construction work in process—Continued.			
Less revenues earned during construction, as follows:			
Rentals of buildings	$18,869.58		
Rentals of grazing and farming lands	2.00		
Rentals of irrigation water	457,069.94		
Contractors' freight refunds	2,671.66		
Other revenues, unclassified	11.00		
Less cost adjustments—			
Profit on mess-house operations	5,544.13		
Profit on mercantile store operations	20,419.44		
Profit on hospital operations	4,014.43		
Total deductions		$508,602.18	
Net cost of construction of project to date			$6,285,556.03
Total assets			6,386,773.96

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid progress earnings under construction contracts		136.26	
Unpaid contract holdbacks		4,204.70	
Unpaid labor		10,215.60	
Unpaid purchases		2,961.22	
Unpaid freight and express charges		1,445.22	
Unpaid passenger fares		30.05	
Unpaid agreements to purchase real property		1,257.00	
Unredeemed coupon books		408.35	
Unredeemed meal tickets		53.75	
Other unpaid items unclassified (water rights)		49,990.47	
			70,702.62
Contingent obligations:			
Guaranty and special deposit		6.73	
Value of outstanding ditch systems		68,562.68	
			68,569.41
Capital investment:			
Disbursement vouchers	$6,701,634.40		
Transfer vouchers received from other projects	178,109.05		
		6,879,743.45	
Less—			
Collections	597,122.98		
Transfer vouchers issued to other projects	35,118.54		
		632,241.52	
Net investment			6,247,501.93
Total liabilities, reserves, and capital investments of the Government			6,386,773.96

Assets, liabilities, reserves, and capital, Boise project, to June 30, 1917.

ASSETS.

Cash:		
In special fiscal agent's possession, awaiting remittance	$636.20	
Cash in special deposit account	2,690.00	
		$3,326.20

Inventory of stock on hand:			
Stores issued and not used	$10,448.66		
Storehouse stock	23,712.07		
Cement	4,106.80		
Structural iron and steel	2,218.73		
Lumber	7,120.89		
Explosives	1,459.52		
Forage in stock	1,321.67		
Fuel	1,524.14		
Goods in transit	2,206.96		
Freight and handling on inventory property	7,597.55		
Equipment adjustment	[1] 1,543.16		
		$60,173.83	
Less depreciation on inventories		7,822.71	
			$52,351.12
Accounts receivable:			
Uncollected rentals of irrigation water		18,901.00	
Other uncollected items unclassified		8,256.33	
Unadjusted transfers to other projects		7,073.05	
			34,230.38
Construction work in process:			
Gross cost of construction of project to date	$11,479,209.33		
Gross operation and maintenance cost during construction	920,946.98		
Gross cost of producing commercial power during construction	28,441.38		
Plant accounts	58,792.95		
		12,487,390.64	
Less revenues earned during construction, as follows—			
Rentals of buildings	26,757.32		
Rentals of grazing and farming lands	14,512.29		
Rentals of power and light	64,126.21		
Rentals of irrigation water	510,923.24		
Contractors' freight refunds	13,082.53		
Forfeitures by defaulting bidders and contractors	24,197.92		
Other revenues, unclassified	20,479.60		
Less cost adjustments—			
Profit on mess-house operations	57,494.12		
Profit on mercantile store operations	44,945.95		
Loss on hospital operations	[1] 5,408.28		
Profit on power used for drain construction	19,210.28		
Total deductions		790,321.18	
Net cost of construction of project to date			11,697,069.46
Total assets			11,786,977.16

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:		
Unpaid labor	$17,858.23	
Unpaid purchases	7,604.80	
Unpaid freight and express charges	4,270.25	
Unpaid passenger fares	303.90	
Unpaid agreements to purchase real property	4,214.10	
Unredeemed coupon books	188.12	
Unredeemed meal tickets	68.76	
Guarantee and special deposits	694.00	
Other unpaid items unclassified	4,062.03	
		39,264.19

[1] Deduct.

Capital investment:			
Disbursement vouchers	$12,448,774.76		
Transfer vouchers received from other projects	463,666.50		
		$12,912,441.26	
Less—			
Collections, miscellaneous	1,025,470.72		
Transfer vouchers issued to other projects	139,257.57		
		1,164,728.29	
Net investment			$11,747,712.97
Total liabilities, reserves, and capital investments of the Government			11,786,977.16

Assets, liabilities, reserves, and capital, Minidoka project, to June 30, 1917.

ASSETS.

Cash:			
In employees' hands, awaiting transfer to special fiscal agents		$716.12	
Cash in special deposit account		2,452.17	
			$3,168.29
Inventory of stock on hand:			
Storehouse stock		27,880.86	
Cement		242.74	
Structural iron and steel		339.16	
Lumber		5,741.29	
Explosives		183.27	
Forage in stock		434.92	
Fuel		272.99	
Products of local operations		[1] 25.51	
Freight and handling on inventory property		[1] 18.49	
			35,051.23
Accounts receivable:			
Construction charges due and uncollected from water-right applicants		11,819.74	
Construction charges unaccrued on contracts with water-right applicants		4,751,060.01	
Operation and maintenance charges due and uncollected from water-right applicants		75,643.40	
Uncollected rentals of power and light		7,390.26	
Uncollected rentals of irrigation water		56,685.43	
Other uncollected items unclassified		6,509.24	
Unadjusted transfers to other projects		1,282.24	
			4,910,390.32
Construction work in process:			
Gross cost of construction of project to date	$5,444,535.12		
Gross operation and maintenance cost during construction	330,353.90		
Plant accounts	10,139.88		
		5,785,028.90	
Less revenues earned during construction, as follows:			
Rentals of buildings	8,783.68		
Rentals of grazing and farming lands	1,668.41		
Rentals of irrigation water	53,271.20		
Contractors' freight refunds	552.39		
Forfeitures by defaulting bidders and contractors	90.00		
Other revenues, unclassified	9,182.73		

[1] Deduct.

Construction work in process—Continued.			
Less cost adjustments—Profit	$1,733.14		
Total deductions		$75,281.55	
Net cost of construction project to date			$5,709,747.35
Operation and maintenance deficit			52,962.91
Total assets			10,711,320.10

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid progress earnings under construction contracts		$15,848.71	
Unpaid labor		9,805.13	
Unpaid purchases		2,666.62	
Unpaid freight and express charges		3,164.43	
Unpaid passenger fares		235.21	
Unredeemed meal tickets		380.69	
Guarantee and special deposits		2,452.17	
Other unpaid items unclassified		84.37	
			34,637.33
Reserves for repayment to reclamation fund of cost of project:			
Value of construction contracts with water-right applicants		5,439,918.67	
Construction charges paid in advance by water-right applicants		13,097.21	
Construction charges paid and forfeited by water-right applicants		8,209.92	
Penalties paid on construction charges by water-right applicants		2,306.21	
			5,463,532.01
Net power revenues		78,252.47	
Net revenues from sale of town lots		135,761.91	
Receipts from sale of stored water		53,608.65	
			267,623.03
Capital investment:			
Disbursement vouchers	$6,280,633.28		
Joint construction vouchers received	210.00		
Transfer vouchers received from other projects	333,235.32		
		6,614,078.60	
Less:			
Collections	1,439,367.95		
Collection vouchers, repayment refunds	483.50		
Joint construction vouchers issued	210.00		
Transfer vouchers, issued to other projects	228,489.67		
		1,668,551.12	
Net investment			4,945,527.73
Total liabilities, reserves, and capital investments of the Government			10,711,320.10

Operating expenses and revenues, Minidoka project, to June 30, 1917.

EXPENSES.

Feature.	Fiscal year 1917.			To end of fiscal year 1917.		
	Operation.	Maintenance.	Total.	Operation.	Maintenance.	Total.
Storage works:						
Jackson Lake Dam	$1,596.93	$25.50	$1,622.43	$4,379.52	$29.67	$4,409.19
Snake River carriage	8,285.37	.....	8,285.37	37,869.55	.....	37,869.55
Minidoka Dam and headwork	2,303.58	9,922.35	12,225.93	5,952.55	13,607.10	19,559.65
	12,185.88	9,947.85	22,133.73	48,201.62	13,636.77	61,838.39
Pumping for irrigation:						
South Side pumping stations	19,823.35	[1] 27,752.41	[1] 7,929.06	174,255.37	43,836.12	218,091.49
North Side pumping stations	447.29	[1] 1,145.30	[1] 698.01	3,888.04	3,645.14	7,533.18
	20,270.64	[1] 28,897.71	[1] 8,627.07	178,143.41	47,481.26	225,624.67
Canal system:						
Main South Side Canal	914.08	5,169.20	6,083.28	7,621.83	17,929.84	25,551.67
Main North Side Canal	638.29	2,323.18	2,961.47	9,430.49	55,292.77	64,723.26
	1,552.37	7,492.38	9,044.75	17,052.32	73,222.61	90,274.93
Lateral system:						
South Side pumping distribution system	26,519.31	24,831.14	51,350.45	86,941.76	151,277.69	238,219.45
South Side gravity distribution system	1,027.98	1,123.41	2,151.39	4,423.87	3,481.52	7,905.39
North Side gravity distribution system	42,938.98	22,410.82	65,349.80	130,287.48	182,882.33	313,169.81
	70,486.27	48,365.37	118,851.64	221,653.11	337,641.54	559,294.65
Drainage system:						
Drain ditches	.....	3,467.32	3,467.32	.....	29,123.66	29,123.66
Drainage pumping stations	779.85	8.61	788.46	18,452.71	6,367.04	24,819.75
	779.85	3,475.93	4,255.78	18,452.71	35,490.70	53,943.41
Undistributed	[1] 83,431.60	[1] 40,052.62	[1] 123,484.22	14,307.58	51,618.83	65,926.41
Total	21,843.41	331.20	22,174.61	497,810.75	559,091.71	1,056,902.46

REVENUES.

Item.	Fiscal year 1917.	To end of fiscal year 1917.
Operation and maintenance charges accrued on contracts with water-right applicants	$62,492.70	$469,051.03
Operation and maintenance charges paid in advance by water-right applicants	[1] 538.20	42.37
Operation and maintenance charges paid and forfeited by water-right applicants	8.14	2,334.92
Penalties on operation and maintenance charges accrued on contracts with water-right applicants	1,320.93	2,979.75
Discount allowed on operation and maintenance charges accrued on contracts with water-right applicants (contra)	[1] 2,155.33	[1] 5,183.05
Rental of land and buildings during operating period	.....	1,027.11
Rentals of power and light during operating period	[1] 86,466.36	.....
Rentals of irrigating water	6,423.12	164,119.08
Accrued and unpaid operation and maintenance accruals transferred to and added to construction charges	[1] 83,675.41	365,531.17
Other revenues unclassified earned during operating period	[1] 81,290.79	4,037.17
Total	[1] 183,881.20	1,003,939.55
Difference (deficit)	206,055.81	52,962.91

[1] Deduct.

Assets, liabilities, reserves, and capital, Jackson Lake enlargement project, to June 30, 1917.

ASSETS.

Inventory of stock on hand:			
Storehouse stock		$24,919.23	
Freight and handling on inventory property		160.70	
			$25,079.93
Accounts receivable:			
Uncollected freight refunds		447.67	
Kuhn Irrigation & Canal Co		24,134.85	
Deposits, condemnation proceedings		1,107.50	
			25,690.02
Construction work in process:			
Gross cost of construction of project to date		754,494.73	
Less revenues earned during construction, as follows—			
Rentals of buildings	$905.55		
Contractors' freight refunds	479.01		
Forfeitures by defaulting bidders and contractors	767.65		
Cost adjustments—Loss on mercantile store operations	[1] 168.00		
Total deductions		1,984.21	
Net cost of construction of project to date			752,510.52
Total assets			803,280.47

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid labor		$78.25	
Unpaid purchases		7.65	
Unpaid freight and express charges		367.56	
Unpaid passenger fares		8.60	
Unredeemed coupon books		11.85	
Unredeemed meal tickets		5.05	
Other unpaid items unclassified		2.67	
Twin Falls Canal Co		9,985.33	
			$10,466.96
Reserves for repayment to reclamation fund of cost of project:			
Charges accrued on Jackson Lake enlargement:			
Kuhn Irrigation & Canal Co		598,998.18	
Twin Falls Canal Co		186,573.21	
			785,571.39
Capital investment:			
Disbursement vouchers	$723,433.29		
Transfer vouchers received from other projects	103,434.25		
		826,867.54	
Less—			
Collections	812,406.39		
Transfer vouchers issued to other projects	7,219.03		
		819,625.42	
Net investment			7,242.12
Total liabilities, reserves, and capital investments of the Government			803,280.47

[1] Deduct.

Assets, liabilities, reserves, and capital, Garden City project, to June 30, 1917.

ASSETS.

Inventory of stock on hand			$4,349.11
Construction work in process:			
Gross cost of construction of project to date		$385,467.57	
Less revenues earned during construction, as follows—			
Rentals of buildings	$979.58		
Contractors' freight refunds	1,911.73		
Forfeitures by defaulting bidders and contractors	5,800.00		
Other revenues, unclassified	13.00		
Less cost adjustments—			
Profit on mess house operations	860.82		
Profit on hospital operations	585.58		
Total deductions		10,150.71	
Net cost of construction of project to date			375,316.86
Total assets			379,665.97

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable: Unpaid contract holdbacks			3,711.86
Capital investment:			
Disbursement vouchers	$380,110.76		
Transfer vouchers received from other projects	12,294.10		
		$392,404.86	
Less—			
Collections	4,597.47		
Collection vouchers, repayment refunds	247.00		
Transfer vouchers issued to other projects	11,606.28		
		16,450.75	
Net investment			375,954.11
Total liabilities, reserves, and capital investments of the Government			379,665.97

Assets, liabilities, reserves, and capital, Huntley project, to June 30, 1917.

ASSETS.

Cash: Cash in special deposit account		$619.75
Inventory of stock on hand:		
Storehouse stock	$26,329.60	
Cement	1,280.48	
Structural iron and steel	2,879.24	
Lumber	3,245.22	
Explosives	10.58	
Forage in stock	543.18	
Fuel	566.08	
Goods in transit	2,997.76	
Products of local operations	582.30	
Freight and handling on inventory property	20.73	
		38,455.17

Accounts receivable:			
Construction charges due and uncollected from water-right applicants		$6,084.21	
Construction charges unaccrued on contracts with water-right applicants		967,265.34	
Operation and maintenance charges due and uncollected from water-right applicants		12,691.12	
Uncollected rentals of irrigation water		[1] 97.11	
Other uncollected items unclassified		26.00	
Unadjusted transfers to other projects		610.59	
			$986,580.15
Construction work in process:			
Gross cost of construction of project to date	$1,013,061.98		
Gross supplemental construction cost of project to date	565,362.89		
Plant accounts	14,576.61		
		1,593,001.48	
Less revenues earned during construction, as follows—			
Rentals of buildings	315.00		
Rentals of grazing and farming lands	1,100.69		
Rentals of telephones and tolls	406.79		
Contractors' freight refunds	7,633.45		
Other revenues, unclassified	212.00		
Less cost adjustments—Profit on hospital operations	2,816.06		
Total deductions		12,483.99	
Nest cost of construction of project to date			1,580,517.49
Operation and maintenance deficit			87,204.67
Total assets			2,693,377.23

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid labor		$9,077.45	
Unpaid purchases		9,041.37	
Unpaid freight and express charges		4,683.57	
Unpaid passenger fares		30.30	
Guarantee and special deposits		619.75	
Other unpaid items unclassified		458.39	
			$23,910.83
Reserves for repayment to reclamation fund of cost of project:			
Value of construction contracts with water-right applicants		1,174,937.86	
Value of construction contracts with water-right applicants temporarily suspended		73,278.60	
Construction charges paid in advance by water right applicants		1,165.74	
Construction charges paid and forfeited by water-right applicants		3,779.55	
Penalties paid on construction charges by water-right applicants		437.75	
			1,253,599.50
Town sites			42,783.65

[1] Deduct.

Capital investment:		
Disbursement vouchers	$1,937,929.85	
Transfer vouchers received from other projects	96,883.71	
		$2,034,813.56
Less—		
Collections	500,540.34	
Collection vouchers, repayment refunds	631.52	
Transfer vouchers issued to other projects	160,558.45	
		661,730.31
Net investment		$1,373,083.25
Total liabilities, reserves, and capital investments of the Government		2,693,377.23

Operating expenses and revenues, Huntley project, to June 30, 1917.

EXPENSES.

Feature.	Fiscal year 1917.			To end of fiscal year 1917.		
	Operation.	Maintenance.	Total.	Operation.	Maintenance.	Total.
Pumping for irrigation		[1] $950.55	[1] $950.55	$3,030.23	$6,761.56	$9,791.79
Canal system	$757.55	3,220.97	3,978.52	14,031.54	38,758.94	52,790.48
Lateral system	2,641.20	14,272.10	16,913.30	26,746.58	139,884.47	166,631.05
Drainage system		2,421.38	2,421.38		9,239.94	9,239.94
Flood protection system		30.50	30.50		30.50	30.50
Undistributed expenses:						
Telephone system		131.06	131.06		68.23	68.23
Maintenance, buildings		46.18	46.18		2,879.72	2,879.72
General expense		[1] 978.21	[1] 978.21		1,706.69	1,706.69
Superintendence and accounts		525.84	525.84		525.84	525.84
Engineering		148.15	148.15		377.08	377.08
Camp maintenance		70.17	70.17		70.17	70.17
Crop reports		[1] 250.24	[1] 250.24			
Total		[1] 307.05	[1] 307.05		5,627.73	5,627.73
Total	3,398.75	18,687.35	22,086.10	43,808.35	200,303.14	244,111.49

REVENUES.

Item.	Fiscal year 1917.	To end of fiscal year 1917.
Operation and maintenance charges accrued on contracts with water-right applicants	$26,544.54	$149,010.14
Operation and maintenance charges paid in advance by water-right applicants	261.30	261.30
Operation and maintenance charges paid and forfeited by water-right applicants		949.79
Penalties on operation and maintenance charges accrued on contracts with water-right applicants	365.84	788.29
Discount allowed on operation and maintenance charges accrued on contracts with water-right applicants (contra)	[1] 616.68	[1] 1,161.13
Rental of land and buildings during operating period	485.89	4,617.19
Rental of grazing and farming lands during operating period	18.75	42.50
Rentals of irrigation water	103.03	447.49
Rental of telephone and tolls during operating period		2.35
Accrued and unpaid operation and maintenance accruals transferred to and added to construction charges	70.00	1,772.61
Other revenues unclassified, earned during operating period	51.50	176.29
Total	27,284.17	156,906.82
Difference (deficit)	[2] 5,198.07	87,204.67

[1] Deduct. [2] Excess.

Assets, liabilities, reserves, and capital, Milk River project, to June 30, 1917.

ASSETS.

Cash: Cash in special deposit account			$1,402.00
Inventory of stock on hand:			
Stores issued and not used		$827.84	
Storehouse stock		10,790.32	
Cement		4,999.20	
Equipment adjustment		7,040.98	
Products of local operations		907.66	
Freight and handling on inventory property		[1] 1,953.68	
			22,612.32
Accounts receivable:			
Uncollected rentals of grazing and farming lands		82.00	
Uncollected rentals of irrigation water		4,857.58	
Uncollected freight refunds		1,921.93	
			6,861.51
Construction work contracted:			
Unearned value of construction work contracted		87,795.79	
Estimated engineering expenses on construction work contracted		13,169.37	
			100,965.16
Construction work in process:			
Gross cost of construction of project to date	$2,912,364.10		
Gross operation and maintenance cost during construction	61,297.95		
Undistributed clearing accounts	4,270.29		
Plant accounts	10,000.50		
		2,987,932.84	
Less revenues earned during construction, as follows:			
Rentals of buildings	1,987.63		
Rentals of grazing and farming lands	2,956.21		
Rentals of irrigation water	18,568.17		
Contractors' freight refunds	18,872.74		
Forfeitures by defaulting bidders and contractors	3,915.26		
Other revenues, unclassified	720.65		
Less cost adjustments:			
Profit on mess house operations	3,944.38		
Profit on mercantile store operations	3,632.28		
Profit on hospital operations	437.38		
Total deductions		55,034.67	
Net cost of construction of project to date			2,932,898.17
Total assets			3,064,739.16

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:	
Unpaid progress earnings under construction contracts	$21,640.00
Unpaid contract holdbacks	10,840.50
Unpaid labor	2,027.21
Unpaid purchases	4,539.64
Unpaid freight and express charges	5,704.00
Unpaid passenger fares	103.03
Unpaid agreements to purchase real property	2,618.80

[1] Deduct.

Accounts payable—Continued.			
Unredeemed coupon books		$29.10	
Other unpaid items unclassified		563.26	
Guarantee and special deposit		1,402.00	
			$49,467.54
Contingent obligations:			
Unearned value of construction work contracted		87,795.79	
Estimated engineering expenses on construction work contracted		13,169.37	
			100,965.16
Reserves for repayment to reclamation fund of cost of project: Receipts from sale of town lots			848.17
Capital investment:			
Disbursement vouchers	2,845,104.11		
Transfer vouchers received from other projects	153,297.31		
		2,998,401.42	
Less:			
Collections	46,400.50		
Transfer vouchers issued to other projects	36,846.29		
Net investment		83,246.79	
			2,915,154.63
Total liabilities, reserves, and capital investments of the Government			3,064,739.16

Assets liablilities, reserves, and capital, St. Mary storage unit, to June 30, 1917.

ASSETS.

Inventory of stock on hand:			
Stores issued and not used		$8,621.66	
Storehouse stock		32,453.22	
Cement		19,360.94	
Structural iron and steel		8,750.27	
Lumber		3,196.10	
Explosives		663.45	
Forage in stock		12,180.07	
Fuel		7,799.41	
Goods in transit		654.69	
Freight and handling on inventory property		[1] 3,222.53	
			$90,457.28
Accounts receivable:			
Uncollected freight refunds		1,243.27	
Other uncollected items unclassified		257.71	
			1,500.98
Construction work in process:			
Gross cost of construction of project to date	$2,168,754.88		
Gross operation and maintenance cost during construction	7,416.49		
Plant accounts	64,852.87		
Plant accounts (unadjusted clearing accounts)	3,488.92		
		2,244,513.16	
Less revenues earned during construction, as follows:			
Rentals of buildings	17,331.33		
Rentals of telephones and tolls	685.65		
Contractors' freight refunds	6,758.09		
Forfeitures by defaulting bidders and contractors	2,132.32		
Other revenues, unclassified	18.25		

[1] Deduct.

Construction work in process—Contd.			
Less cost adjustments—			
Loss on mess house operations	$6,530.37		
Profit on mercantile store operations	4,835.12		
Profit on hospital operations	1,312.68		
Loss on farming operations	14.36		
Total deductions		$26,528.71	
Net cost of construction of project to date			$2,217,984.45
Total assets			2,309,942.71

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid labor		$7,401.57	
Unpaid purchases		6,793.64	
Unpaid freight and express charges		1,667.79	
Unpaid passenger fares		173.28	
Unredeemed coupon books		257.10	
Other unpaid items unclassified, Midwest Engineering Co.		9,502.89	
			25,796.27
Capital investment:			
Disbursement vouchers	$2,175,482.39		
Transfer vouchers received from other projects	221,497.46		
		2,396,979.85	
Less—			
Collections	57,716.47		
Transfer vouchers issued to other projects	55,116.94		
		112,833.41	
Net investment			2,284,146.44
Total liabilities, reserves, and capital investments of the Government			2,309,942.71

Assets, liabilities, reserves, and capital, Sun River project, to June 30, 1917.

ASSETS.

Cash:			
In special fiscal agent's possession, awaiting remittance		$51.45	
In other employees' hands, awaiting transfer to special fiscal agents		23.50	
			$74.95
Inventory of stock on hand:			
Stores issued and not used		13,052.33	
Storehouse stock		36,306.85	
Cement		3,873.25	
Lumber		3,883.56	
Explosives		102.91	
Fuel		288.01	
Equipment adjustment		66.98	
Products of local operations		734.95	
Freight and handling on inventory property		47.39	
			58,356.23
Accounts receivable:			
Construction charges due and uncollected from water-right applicants		3,127.91	
Construction charges unaccrued on contracts with water-right applicants		274,858.64	
Operation and maintenance charges due and uncollected from water-right applicants		3,859.85	
Uncollected rentals of buildings		23.50	
Uncollected rentals of grazing and farming lands		876.50	

Accounts receivable—Continued.			
Uncollected freight refunds		$6,403.57	
Other uncollected items unclassified		7,904.40	
			$297,054.37
Construction work contracted:			
Unearned value of construction work contracted		84,723.03	
Estimated engineering expenses on construction work contracted		14,707.45	
			99,430.48
Construction work in process:			
Gross cost of construction of project to date	$3,196,868.61		
Unadjusted clearing accounts	3,876.90		
Plant accounts	58,841.61		
		3,259,587.12	
Less revenues earned during construction, as follows—			
Rentals of buildings	14,645.89		
Rentals of grazing and farming lands	9,873.16		
Rentals of telephones and tolls	317.55		
Contractors' freight refunds	18,381.79		
Forfeitures by defaulting bidders and contractors	5,720.00		
Other revenues, unclassified	2.50		
Less cost adjustments—			
Profit on mess-house operations	3,546.43		
Profit on mercantile store operations	2,940.61		
Profit on hospital operations	1,165.16		
Total deductions		56,593.09	
Net cost of construction of project to date			3,202,994.03
Operation and maintenance deficit			44,119.11
Total assets			3,702,029.17

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:		
Unpaid progress earnings under construction contracts	$3,260.90	
Unpaid contract holdbacks	745.37	
Unpaid labor	8,438.36	
Unpaid purchases	7,760.09	
Unpaid freight and express charges	2,541.69	
Unpaid passenger fares	180.47	
Unredeemed coupon books	30.82	
Unredeemed meal tickets	93.74	
Other unpaid items unclassified	1,499.05	
		$24,550.49
Contingent obligations:		
Unearned value of construction work contracted	84,723.03	
Estimated engineering expenses on construction work contracted	14,707.45	
		99,430.48
Reserves for repayment to reclamation fund of cost of project:		
Value of construction contracts with water-right applicants	309,742.17	
Value of construction contracts with water-right applicants temporarily suspended	70,900.56	
Construction charges paid in advance by water-right applicants	29,421.39	
Construction charges paid and forfeited by water-right applicants	3,626.28	

Reserves for repayment to reclamation fund of cost of project—Continued.			
Penalties paid on construction charges by water-right applicants		$262.25	
Receipts from sale of town lots		9,527.13	
			$423,479.78
Capital investment:			
Disbursement vouchers	$$3,291,273.98		
Transfer vouchers received from other projects	174,661.24		
		3,465,935.22	
Less:			
Collections	238,062.57		
Collection vouchers, repayment refunds	755.85		
Transfer vouchers issued to other projects	72,548.38		
		311,366.80	
Net investment			3,154,568.42
Total liabilities, reserves, and capital investments of the Government			3,702,029.17

Operating expenses and revenues, Sun River project, to June 30, 1917.

EXPENSES.

Feature.	Fiscal year 1917.			To end of fiscal year 1917.		
	Operation.	Maintenance.	Total.	Operation.	Maintenance.	Total.
Storage works: Willow Creek reservoir	$1,853.10	$2,843.57	$4,696.67	$2,900.65	$4,099.53	$7,000.18
Canal system: Fort Shaw Main Canal	1,216.57	2,644.08	3,860.65	6,617.05	20,451.33	27,068.38
Lateral system:						
Lateral A	936.69	2,086.75	3,023.44	5,360.03	17,076.88	22,436.91
Lateral C	715.25	2,991.60	3,706.85	3,379.72	12,353.13	15,732.85
Lateral D	1,306.10	1,001.42	2,307.52	4,944.39	6,025.72	10,970.11
Laterals K and H	513.29	2,474.26	2,987.55	3,340.75	12,683.69	16,024.44
	3,471.33	8,554.03	12,025.36	17,024.89	48,139.42	65,164.31
Undistributed expenses:						
Engineering and inspection	3.40	.....	3.40	3.40	.....	3.40
General expense	[1] 2,160.94	[1] 5,980.25	[1] 8,141.19	212.35	.....	212.35
Superintendence and accounts	484.45	.....	484.45	484.45	.....	484.45
Farming operations	[1] 816.68	.....	[1] 816.68	1,103.49	.....	1,103.49
	[1] 2,489.77	[1] 5,980.25	[1] 8,470.02	1,803.69	.....	1,803.69
Plant accounts	164.35	.....	164.35	164.35	.....	164.35
Total	4,215.58	8,061.43	12,277.01	28,510.63	72,690.28	101,200.91

REVENUES.

Item.	Fiscal year 1917.	To end of fiscal year 1917.
Operation and maintenance charges accrued on contracts with water-right applicants	$9,359.65	$53,079.33
Operation and maintenance charges paid in advance by water-right applicants	[1] 185.37	119.95
Operation and maintenance charges paid and forfeited by water-right applicants	378.43	1,014.09
Penalties on operation and maintenance charges on contracts with water-right applicants	102.20	102.97
Discount allowed on operation and maintenance charges accrued on contracts with water-right applicants (contra)	[1] 273.65	[1] 551.07
Rentals of irrigation water	7.06	506.85
Accrued and unpaid operation and maintenance accruals transferred to and added to construction charges	[1] 68.26	2,742.45
Other revenues unclassified, earned during operating period	.....	67.23
Total	9,320.06	57,081.80
Difference (deficit)	2,956.95	44,119.11

[1] Deduct.

Assets, liabilities, reserves, and capital, Lower Yellowstone project, to June 30, 1917.

ASSETS.

Inventory of stock on hand:			
Storehouse stock		$861.25	
Cement		250.79	
Terra cotta pipe		253.14	
Lumber		1,776.99	
Forage in stock		515.44	
Fuel		115.92	
Products of local operations (ice)		63.10	
Freight and handling on inventory property		[1] 121.16	
Equipment adjustment		5,567.28	
			$9,282.75
Accounts receivable:			
Construction charges due and uncollected from water-right applicants		56,649.39	
Construction charges unaccrued on contracts with water-right applicants		1,158,864.16	
Operation and maintenance charges due and uncollected from water-right applicants		101,742.73	
Uncollected rentals of grazing and farming lands		440.00	
Uncollected rentals of irrigation water		4,785.91	
			1,322,482.19
Construction work in process:			
Gross cost of construction of project to date	$2,835,438.98		
Gross supplemental construction cost of project to date	62,829.73		
		2,898,268.71	
Less revenues earned during construction, as follows—			
Rentals of buildings	422.00		
Rentals of irrigation water	45,692.84		
Rentals of telephones and tolls	4,331.04		
Contractors' freight refunds	21,261.33		
Less cost adjustments—			
Loss on mess-house operations	[1] 4,422.69		
Total deductions		67,284.52	
Net cost of construction of project to date			2,830,984.19
Operation and maintenance deficit			361,598.56
Total assets			4,524,347.69

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:		
Unpaid contract holdbacks	$13,832.11	
Unpaid labor	2,740.63	
Unpaid purchases	473.19	
Unpaid freight and express charges	334.59	
Unpaid passenger fares	6.75	
Unpaid agreements to purchase real property	456.00	
Other unpaid items unclassified	11,927.68	
		$29,770.95
Reserves for repayment to reclamation fund of cost of project:		
Value of construction contracts with water-right applicants	1,048,483.35	
Value of construction contracts with water-right applicants temporarily suspended	177,013.95	
Construction charges paid in advance by water-right applicants	25,327.52	

[1] Deduct.

Reserves for repayment to reclamation fund of cost of project—Continued.			
Construction charges paid and forfeited by water-right applicants		$595.00	
Penalties paid on construction charges by water-right applicants		14.88	
			$1,251,434.70
Capital investment:			
Disbursement vouchers	$3,339,586.81		
Transfer vouchers received from other projects	106,830.90		
		3,446,417.71	
Less—			
Collections, mscellaneous	161,931,19		
Transfer vouchers issued to other projects	41,344.48		
		203,275.67	
Net investment			3,243,142.04
Total liabilities, reserves, and capital investments of the Government			4,524,347.69

Operating expenses and revenues, Lower Yellowstone project, to June 30, 1917.

EXPENSES.

Feature.	Fiscal year, 1917.			To end of fiscal year 1917.		
	Operation.	Maintenance.	Total.	Operation.	Maintenance.	Total.
Diversion dam					$93,337.98	$93,337.98
Canal system (main canal)	$1,562.69	$5,176.68	$6,739.37	$31,712.93	140,928.46	172,641.39
Lateral system	1,961.08	7,618.91	9,579.99	22,509.98	111,847.61	134,357.59
Undistributed expenses:						
Maintenance of permanent improvements		85.17	85.17		119.50	119.50
Camp maintenance		793.64	793.64		56,053.38	56,053.38
Superintendence and accounts		2,081.26	2,081.26		2,081.26	2,081.26
Telephone maintenance		12.98	12.98		10,872.52	10,872.52
Farm operation and maintenance		422.20	422.20	7,079.98	6,907.35	13,987.33
General expense		4,780.27	4,780.27		4,765.35	4,765.35
		8,175.52	8,175.52	7,079.98	80,799.36	87,879.34
Supplemental construction chargeable to operation and maintenance		14,360.89	14,360.89		14,360.89	14,360.89
Plant accounts		7,073.50	7,073.50		7,073.50	7,073.60
Total	3,523.77	42,405.50	45,929.27	61,302.89	448,347.80	509,650.69

REVENUES.

Item.	Fiscal year, 1917.	To end of fiscal year 1917.
Operation and maintenance charges accrued on contracts with water-right applicants	[1] $160.80	$137,486.96
Operation and maintenance charges paid in advance by water-right applicants	[1] .75	622.21
Operation and maintenance charges forfeited by water-right applicants		440.00
Penalties on operation and maintenance charges accrued on contracts with water-right applicants		.04
Discount allowed on operation and maintenance charges accrued on contracts with water-right applicants	[1] .41	[1] 4.63
Rental of land and buildings during operating period	371.33	6,230.59
Rental of grazing and farm lands during operating period	655.00	1,234.00
Rental of telephones and tolls during operating period		499.97
Accrued and unpaid operation and maintenance charges transferred to and added to construction charges		1,700.05
Other revenues unclassified, earned during operating period	956.10	1,429.81
Clearing account adjustments	[1] 147,04	[1] 1,587.87
Total	1,673.43	148,052.13
Difference (deficit)	44,255.84	361,598.56
Water rentals credited construction revenues will reduce this deficit by	18,415.90	45,692.84

[1] Deduct.

Assets, liabilities, reserves, and capital, North Platte project, to June 30, 1917.

ASSETS.

Cash:			
In employees' hands, awaiting transfer to special fiscal agents		$163.29	
Cash in special deposit account		4,168.89	
			$4,332.18
Inventory of stock on hand:			
Stores issued and not used		11,161.22	
Storehouse stock		47,265.57	
Cement		3,451.52	
Structural iron and steel		21,181.41	
Lumber		12,497.77	
Explosives		99.89	
Forage in stock		1,289.77	
Fuel		2,570.06	
Goods in transit		15,442.16	
Products of local operations		8,973.68	
			123,933.05
Accounts receivable:			
Construction charges due and uncollected from water-right applicants		56,820.82	
Construction charges unaccrued on contracts with water-right applicants		5,665,464.93	
Operation and maintenance charges due and uncollected from water-right applicants		32,332.10	
Uncollected rentals of irrigation water		2,084.95	
			5,756,702.80
Construction work contracted:			
Unearned value of construction work contracted		720,928.11	
Estimated engineering expenses on construction work contracted		51,686.39	
			772,614.50
Construction work in progress:			
Gross cost of construction of project to date	$7,560,088.04		
Gross operation and maintenance cost during construction	509,805.43		
Plant accounts	127,984.60		
		8,197,878.07	
Less revenue earned during construction, as follows:			
Rentals of buildings	6,464.35		
Rentals of grazing and farming lands	10,546.73		
Rentals of irrigation water	17,736.30		
Contractors' freight refunds	30,966.76		
Forfeitures by defaulting bidders and contractors	16,318.42		
Other revenues, unclassified	1,914.53		
Less cost adjustments—			
Loss on mess-house operations	[1] 21,089.15		
Profit on mercantile store operations	4,806.93		
Profit on hospital operations	6,493.90		
Total deductions		74,158.77	
Net cost of construction of project to date			8,123,719.30
Operation and maintenance deficit			66,677.73
Total assets			14,847,979.56

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid progress earnings under construction contracts		$57,472.86	
Unpaid contract holdbacks		45,721.75	
Unpaid labor		23,097.54	
Unpaid purchases		28,479.16	
Unpaid freight and express charges		16,011.74	
Unpaid passenger fares		1,187.51	
Unredeemed coupon books		26.50	
Unredeemed meal tickets		5.75	
Guaranty and special deposits		4,168.89	
Other unpaid items, unclassified		22.94	
			$176,194.64
Contingent obligations:			
Unearned value of construction work contracted		720,928.11	
Estimated engineering expenses on construction work contracted		51,686.39	
			772,614.50
Reserves for repayment to reclamation fund of cost of project:			
Value of construction contracts with water-right applicants		6,146,354.80	
Value of construction contracts with water-right applicants temporarily suspended		78,585.00	
Construction charges paid in advance by water-right applicants		1,086.49	
Construction charges paid and forfeited by water-right applicants		5,404.90	
Penalties paid on construction charges by water-right applicants		14,760.84	
			6,246,192.03
Capital investment:			
Disbursement vouchers	$8,493,692.71		
Transfer vouchers received from other projects	272,680.47		
		8,766,373.18	
Less—			
Collections	1,084,671.70		
Collection vouchers, repayment refunds	712.54		
Transfer vouchers issued to other projects	28,010.55		
		1,113,394.79	
Net investment			7,652,978.39
Total liabilities, reserves, and capital investments of the Government			14,847,979.56

Operating expenses and revenues, North Platte (interstate) project, to June 30, 1917.

EXPENSES.

Feature.	Fiscal year 1917.			To end of fiscal year 1917.		
	Operation.	Maintenance.	Total.	Operation.	Maintenance.	Total.
Storage works:						
Pathfinder Reservoir	$3,913.85	$1,508.02	$5,421.87			
Lake Alice Reservoir	101.77	233.09	334.86			
Lake Minatare	1,186.81	160.13	1,346.94	$27,962.92	$6,785.52	$34,748.44
Gaging North Platte River	3,702.50		3,702.50			
	8,904.93	1,901.24	10,806.17	27,962.92	6,785.52	34,748.44
Canal system:						
Whalen Diversion Dam	2,488.90	446.19	2,935.09			
First diversion, Main Canal	5,627.59	17,589.67	23,217.26	80,164.79	139,264.93	219,429.72
Second diversion, Main Canal	4,290.71	6,437.63	10,728.34			
	12,407.20	24,473.49	36,880.69	80,164.79	139,264.93	219,429.72
Lateral system:						
Rawhide first and second lateral districts	12,332.43	24,004.37	36,336.80			
Third lateral district	9,361.01	12,767.20	22,128.21	140,924.22	134,593.57	275,517.79
	21,693.44	36,771.57	58,465.01	140,924.22	134,593.57	275,517.79
Drainage system:						
Open drains—						
Alliance drain		5,920.00	5,920.00			
Stewart drain		545.00	545.00			
Sheep Creek drain		640.00	640.00			
Dunham drain		270.00	270.00			
Banner drain		15.00	15.00			
Hiersche drain		110.00	110.00			
Spottedtail drain		10.00	10.00	375.40	12,129.49	12,504.89
Closed drains—						
Dunham drain		280.00	280.00			
McAllister drain		62.11	62.11			
Sunflower		30.00	30.00			
Banner		20.00	20.00			
Hiersche		40.00	40.00			
		7,942.11	7,942.11	375.40	12,129.49	12,504.89
Undistributed expenses: Experimental investigation	58.68		58.68			
Crop reports	1,361.83		1,361.83	1,420.51		1,420.51
	1,420.51		1,420.51	1,420.51		1,420.51
Total	44,426.08	71,088.41	115,514.49	250,847.84	292,773.51	543,621.35

REVENUES.

Item.	Fiscal year 1917.	To end of fiscal year 1917.
Operation and maintenance charges accrued on contracts with water right applicants	$113,907.65	$480,050.18
Operation and maintenance charges paid in advance by water right applicants	37.66	37.66
Operation and maintenance charges paid and forfeited by water right applicants		1,163.95
Penalties on operation and maintenance charges accrued on contracts with water right applicants	1,501.70	2,152.41
Discount allowed on operation and maintenance charges accrued on contracts with water right applicants (contra)	[1] 3,204.31	[1] 5,174.51
Rentals of irrigation water	7,969.84	13,131.05
Total	120,212.54	491,360.74
Difference (excess and deficit)	[2] 4,698.05	52,260.61

[1] Deduct. [2] Excess.

Assets, liabilities, reserves, and capital, Truckee-Carson project, June 30, 1917to.

ASSETS.

Cash in special deposit account			$8,264.00
Inventory of stock on hand:			
Stores issued and not used		$101.71	
Storehouse stock		36,454.46	
Cement		428.79	
Structural iron and steel		283.28	
Lumber		3,748.53	
Explosives		51.61	
Forage in stock		862.61	
Fuel		68.94	
Automobile parts and supplies		535.34	
Vitrified pipe		771.72	
Freight and handling on inventory property		[1] 1,953.83	
			41,353.16
Accounts receivable:			
Construction charges due and uncollected from water right applicants		4,499.99	
Construction charges unaccrued on contracts with water right applicants		733,219.16	
Operation and maintenance charges due and uncollected from water right applicants		16,030.64	
Uncollected rentals of grazing and farming lands		3,251.80	
Uncollected rentals of power and light		316.74	
Uncollected rentals of irrigation water		32.00	
Undistributed disbursement vouchers		13.17	
Other uncollected items unclassified		180.41	
			757,543.91
Construction work in process:			
Gross cost of construction of project to date	$5,995,478.01		
Plant accounts	40,353.95		
		6,035,831.96	
Less revenues earned during construction, as follows:			
Rentals of buildings	17,684.11		
Rentals of grazing and farming lands	20,013.56		
Contractors' freight refunds	412.07		
Forfeitures by defaulting bidders and contractors	499.95		
Less cost adjustments—			
Profit on mess house operations	17,739.31		
Profit on mercantile store operations	17,825.35		
Loss on hospital operations	[1] 2,462.79		
Total deductions		71,711.56	
Net cost of construction of project to date			5,964,120.40
Operation and maintenance deficit			169,960.83
Total assets			6,941,242.30

[1] Deduct.

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid contract holdbacks		$6,680.85	
Unpaid labor		7,455.12	
Unpaid purchases		6,556.91	
Unpaid freight and express charges		3,151.99	
Unpaid passenger fares		285.30	
Unpaid agreements to purchase real property		115.00	
Unredeemed coupon books		119.85	
Unredeemed meal tickets		174.48	
Other unpaid items unclassified		1,186.71	
			$25,726.21
Contingent obligations: Guarantee and special deposits			8,264.00
Reserves for repayment to reclamation fund of cost of project:			
Value of construction contracts with water right applicants		1,033,709.13	
Value of construction contracts with water right applicants temporarily suspended		19,848.00	
Construction charges paid in advance by water applicants		2,488.51	
Construction charges paid and forfeited by water right applicants		1,444.60	
Penalties paid on construction charges by water right applicants		629.82	
Net power revenues		37,554.67	
			1,095,674.73
Capital investment:			
Disbursement vouchers	$6,276,322.85		
Joint construction vouchers received	11,594.86		
Transfer vouchers received from other projects	299,183.42		
		6,587,101.13	
Less:			
Collections	712,575.60		
Collection vouchers, repayment refunds	252.00		
Joint construction vouchers issued	11,594.86		
Transfer vouchers issued to other projects	51,101.31		
		775,523.77	
Net investment			5,811,577.36
Total liabilities, reserves, and capital investments of the Government			6,941,242.30

Operating expenses and revenues, Truckee-Carson project, to June 30, 1917.

EXPENSES.

Feature.	Fiscal year 1917.			To end of fiscal year 1917.		
	Operation.	Maintenance.	Total.	Operation.	Maintenance.	Total.
Storage works:						
Lake Tahoe Reservoir	$1,275.21	.....	$1,275.21	$3,226.35	$41.72	$3,268.07
Lahontan Dam	1,910.42	$895.35	2,805.77	4,389.48	2,008.89	6,398.37
	3,185.63	895.35	4,080.98	7,615.83	2,050.61	9,666.44
Canal system:						
Truckee diversion dam	1,062.05	129.92	1,191.97	4,868.36	1,355.43	6,223.79
Carson diversion dam	333.66	.....	333.66	2,582.71	2,197.77	4,780.48
Truckee Canal	544.75	3,267.15	3,811.90	7,309.79	20,439.38	27,749.17
T line	659.87	2,091.17	2,751.04	904.95	2,860.68	3,765.63
V line	95.50	70.98	166.48	6,126.89	11,326.17	17,453.06
AA line	124.64	193.46	318.10	373.38	401.88	775.26
L line	124.04	22.96	147.00	575.49	245.31	820.80
S line	160.25	64.40	224.65	1,866.07	3,252.93	5,119.00
D line	8.81	64.11	72.92	73.00	372.27	445.27
	3,113.57	5,904.15	9,017.72	24,680.64	42,451.82	67,132.46
Lateral system:						
Truckee Canal district	2,199.44	5,077.80	7,277.24	16,008.80	30,522.66	46,531.46
T Canal district	499.64	3,566.69	4,066.33	15,932.25	32,992.45	48,924.70
V Canal district	500.94	224.77	725.71	2,050.53	1,373.72	3,424.25
AA Canal district	1,562.46	3,275.42	4,837.88	17,478.09	19,740.81	37,218.90
L Canal district	2,239.24	3,505.97	5,745.21	36,090.75	61,473.45	97,564.20
S Canal district	2,649.09	6,705.39	9,354.48	28,521.93	49,256.63	77,778.56
D Canal district	157.76	863.25	1,021.01	2,318.40	5,203.12	7,521.52
	9,808.57	23,219.29	33,027.86	118,400.75	200,562.84	318,963.59
Drainage system:						
B drain	.....	43.45	43.45	.....	47.45	47.45
A–D drain	.....	706.53	706.53	.....	777.53	777.53
B–A–D drain	.....	12.43	12.43	.....	14.43	14.43
T district surface drains	.....	322.89	322.89	.....	5,011.42	5,011.42
AA district surface drains	.....	669.03	669.03	.....	3,819.99	3,819.99
L district surface drains	.....	394.89	394.89	629.01	28,354.60	28,983.61
S district surface drains	.....	531.11	531.11	.....	8,665.13	8,665.13
D district surface drains	.....	119.79	119.79	.....	279.97	279.97
L district subsurface drains	56.90	34.65	91.55	717.29	577.73	1,295.02
	56.90	2,834.77	2,891.67	1,346.30	47,548.25	48,894.55
Flood-protection system: Carson River channel	.....	155.37	155.37	.....	2,148.77	2,148.77
Undistributed expenses:						
Power system	138.88	13.40	152.28	.....	13.40	13.40
Telephone	120.96	571.78	692.74	.....	.....	.....
Maintenance of buildings	.....	1,908.19	1,908.19	.....	.....	.....
Maintenance of bridges and roads	.....	290.12	290.12	.....	.....	.....
Stream gauging	569.10	.....	569.10	.....	.....	.....
Betterment year 1914 charged to maintenance	.....	.....	.....	.....	2,386.97	2,386.97
	828.94	2,783.49	3,612.43	.....	2,400.37	2,400.37
Total	16,993.61	35,792.42	52,786.03	152,043.52	297,162.66	449,206.18

Operating expenses and revenues, Truckee-Carson project, to June 30, 1917—Continued.

REVENUES.

Item.	Fiscal year 1917.	To end of fiscal year 1917.
Operation and maintenance charges accrued on contracts with water-right applicants	$42,583.06	$257,270.59
Operation and maintenance charges paid in advance by water-right applicants	209.90	238.53
Operation and maintenance charges paid and forfeited by water-right applicants		1,240.87
Penalties on operation and maintenance charges accrued on contracts with water-right applicants	1,000.42	1,945.57
Discounts allowed on operation and maintenance charges accrued on contracts with water-right applicants	[1] 1,032.36	[1] 1,949.05
Rental of land and buildings during operating period	627.40	1,169.67
Rentals of irrigation water	924.94	6,478.74
Accrued and unpaid operation and maintenance accruals transferred to and added to construction charges		2,022.93
Other revenues unclassified, earned during operating period	19.50	10,827.50
Total	44,332.86	279,245.35
Difference, deficit	8,453.17	169,960.83

[1] Deduct.

Assets, liabilities, reserves and capital, Carlsbad project, to June 30, 1917.

ASSETS.

Cash: Cash in special deposit account		$167.25
Inventory of stock on hand:		
Storehouse stock	$8,772.92	
Cement	1,823.76	
Lumber	3,368.02	
Explosives	1,046.48	
Fuel	347.92	
Goods in transit	97.02	
Freight and handling on inventory property	61.16	
		15,517.28
Accounts receivable:		
Construction charges due and uncollected from water-right applicants	14,697.65	
Construction charges unaccrued on contracts with water-right applicants	1,112,653.23	
Operation and maintenance charges due and uncollected from water-right applicants	23,242.10	
Uncollected rentals of buildings	20.00	
Uncollected rentals of irrigation water	277.35	
Uncollected freight refunds	206.92	
Other uncollected items unclassified	2,370.35	
		1,153,467.60
Construction work in process:		
Gross cost of construction of project to date	$1,237,357.67	
Plant accounts	16,222.55	
	1,253,580.22	
Less revenues earned during construction, as follows:		
Rentals of buildings	718.20	
Rentals of irrigation water	8,163.35	
Contractors' freight refunds	218.33	
Other revenues, unclassified	2,584.94	
Less cost adjustments—Loss on mess house operations	[1] 92.92	
Total deductions	11,591.90	
Net cost of construction of project to date		1,241,988.32
Total assets		2,411,140.45

[1] Deduct.

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid labor		$2,810.60	
Unpaid purchases		1,101.47	
Unpaid freight and express charges		1,083.56	
Unpaid passenger fares		39.65	
Unredeemed coupon books		6.65	
Other unpaid items unclassified		3.38	
			$5,045.31
Contingent obligations: Guarantee and special deposits			167.25
Reserves for repayment to reclamation fund of cost of project:			
Value of construction contracts with water-right applicants		1,276,690.00	
Value of construction contracts with water-right applicants temporarily suspended		10,485.00	
Construction charges paid in advance by water-right applicants		694.78	
Construction charges paid and forfeited by water-right applicants		226.30	
Penalties paid on construction charges by water-right applicants		2,680.74	
			1,290,776.82
Capital investment:			
Disbursement vouchers	$1,423,488.75		
Transfer vouchers received from other projects	62,402.18		
		1,485,890.93	
Less—			
Collections	30,307.61		
Collection vouchers, repayment refunds	326,532.55		
Transfer vouchers issued to other projects	13,986.47		
		370,826.63	
Net investment			1,115,064.30
Revenue in excess of cost of operation and maintenance			86.77
Total liabilities, reserves, and capital investments of the Government			2,411,140.45

Operating expenses and revenues, Carlsbad project, to June 30, 1917.

EXPENSES.

Feature.	Fiscal year 1917.			To end of fiscal year 1917.		
	Operation.	Maintenance.	Total.	Operation.	Maintenance.	Total.
Storage works:						
McMillan Reservoir—						
Main dam	$58.94	$85.03	$143.97	$1,287.98	$1,930.77	$3,218.75
East embankment	71.63	126.60	198.23	2,171.83	3,260.67	5,432.50
West embankment	12.41	21.74	34.15	1,078.54	1,616.19	2,694.73
Avalon Reservoir: Diversion dam	185.56	329.32	514.88	1,604.80	2,406.45	4,011.25
	328.54	562.69	891.23	6,143.15	9,214.08	15,357.23
Canal system:						
Main Canal	2,448.89	4,342.28	6,791.17	19,657.82	29,472.44	49,130.26
Black River Cut-off Canal	143.26	253.57	396.83	2,584.80	3,370.25	5,955.05
Black River Canal	1,308.48	2,319.88	3,628.36	5,360.68	8,037.41	13,398.09
	3,900.63	6,915.73	10,816.36	27,603.30	40,880.10	68,483.40
Lateral system:						
East Canal	157.92	279.72	437.64	4,206.77	6,306.77	10,513.54
Laterals and sublaterals	4,546.69	8,096.04	12,642.73	34,081.32	51,655.20	85,736.52
	4,704.61	8,375.76	13,080.37	38,288.09	57,961.97	96,250.06
Drainage system:						
Drain A	40.61	72.20	112.81	493.58	739.55	1,233.13
Drain C	.....	[1] 61.26	[1] 61.26	326.83	489.51	816.34
Drain D	174.84	309.56	484.40	206.77	309.56	516.33
	215.45	320.50	535.95	1,027.18	1,538.62	2,565.80
Undistributed expenses:						
Buildings	1,014.07	1,794.66	2,808.73	4,419.54	6,626.16	11,045.70
General expense	.....	[1] 2,128.10	[1] 2,128.10	2,109.72	3,163.38	5,273.10
Highways, bridges, or roads	103.21	182.83	286.04	303.49	454.58	758.07
Farms	.....	.....	.....	1,247.29	1,870.81	3,118.10
	1,117.28	[1] 150.61	966.67	8,080.04	12,114.93	20,194.97
Supplemental construction cost transferred to gross construction cost	.....	.....	.....	.....	[1] 1,986.85	[1] 1,986.85
Total	10,266.51	16,024.07	26,290.58	81,141.76	119,722.85	200,864.61

REVENUES.

Item.	Fiscal year 1917.	To end of fiscal year 1917.
Operation and maintenance charges accrued on contracts with water-right applicants	$32,021.52	$184,810.43
Operation and maintenance charges paid in advance by water-right applicants	[1] 220.18	350.50
Operation and maintenance charges paid and forfeited by water-right applicants	40.20	151.05
Penalties on operation and maintenance charges accrued on contracts with water-right applicants	1,103.30	1,801.55
Discount allowed on operation and maintenance charges accrued on contracts with water-right applicants	[1] 440.93	[1] 764.82
Rental of land and buildings during operating period	817.71	3,923.15
Rental of grazing and farming lands during operating period	128.00	384.00
Rentals of irrigation water	741.00	5,870.28
Accrued and unpaid operation and maintenance accruals transferred to and added to construction charges	.....	1,934.00
Other revenues unclassified, earned during operating period	327.27	2,491.24
Total	34,517.89	200,951.38
Difference (excess)	8,227.31	86.77

[1] Deduct.

Assets, liabilities, reserves, and capital, Hondo project, to June 30, 1917.

ASSETS.

Accounts receivable: Uncollected rentals of irrigation water			$233.99
Construction work in process:			
Gross cost of construction of project to date	$339,491.68		
Gross operation and maintenance cost during construction	42,129.97		
		$381,621.65	
Less revenues earned during construction, as follows—			
Rentals of grazing and farming lands	286.00		
Rentals of irrigation water	9,163.66		
Contractors' freight refunds	159.63		
Other revenues, unclassified	125.90		
Total deductions		9,735.19	
Net cost of construction of project to date			371,886.46
Total assets			372,120.45

LIABILITIES, RESERVES, AND CAPITAL.

Capital investment:			
Disbursement vouchers	$392,784.15		
Transfer vouchers received from other projects	14,954.73		
		$407,738.88	
Less—			
Collections	34,617.67		
Transfer vouchers issued to other projects	1,000.76		
		35,618.43	
Net investment			$372,120.45
Total liabilities, reserves, and capital investments of the Government			372,120.45

Assets, liabilities, reserves, and capital, Rio Grande project, to June 30, 1917.

ASSETS.

Cash:			
In employees' hands, awaiting transfer to special fiscal agents		$2.35	
Cash in special deposit account		612.10	
			$614.45
Inventory of stock on hand:			
Stores issued and not used		3,140.03	
Storehouse stock		60,065.40	
Cement		1,656.08	
Structural iron and steel		4,100.95	
Lumber		15,827.94	
Explosives		143.06	
Forage in stock		291.08	
Fuel		2,867.25	
Goods in transit		5,676.28	
Freight and handling on inventory property		[1]3,762.83	
			90,005.24

[1] Deduct.

Accounts receivable:			
Uncollected rentals of irrigation water		$17,244.58	
Other uncollected items unclassified		60.00	
Unadjusted transfers to other projects		766.23	
			$18,070.81
Construction work contracted: Unearned value of construction work contracted			184,000.00
Construction work in process:			
Gross cost of construction of project to date	$6,948,247.38		
Gross operation and maintenance cost during construction	219,720.29		
Plant accounts, Rio Grande	38,947.08		
		7,206,914.75	
Less revenues earned during construction, as follows:			
Rentals of buildings	11,608.06		
Rentals of power and light	2,243.33		
Rentals of irrigation water	280,394.40		
Contractors' freight refunds	5,202.05		
Forfeitures by defaulting bidders and contractor	5,350.01		
Other revenues, unclassified	620.19		
Less cost adjustments—			
Loss on mess house operations	[1] 6,516.12		
Profit on mercantile store operations	86,502.69		
Profit on hospital operations	1,421.16		
Total deductions		386,825.77	
Net cost of construction of project to date			6,820,088.98
Total assets			7,112,779.48

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid progress earnings under construction contracts		$14,951.17	
Unpaid contract holdbacks		15,657.80	
Unpaid labor		22,095.17	
Unpaid purchases		11,694.11	
Unpaid freight and express charges		11,129.47	
Unpaid passenger fares		309.15	
Unpaid agreements to purchase real property		14,263.65	
Unredeemed coupon books		589.35	
Guarantee and special deposits		612.10	
Other unpaid items unclassified		80.00	
			$91,381.97
Contingent obligations: Unearned value of construction work contracted			184,000.00
Capital investment:			
Disbursement vouchers	$7,211,720.82		
Transfer vouchers received from other project	359,553.10		
		7,571,273.92	
Less—			
Collections	610,059.51		
Transfer vouchers issued to other projects	123,816.90		
		733,876.41	
Net investment			6,837,397.51
Total liabilities, reserves, and capital investments of the Government			7,112,779.48

[1] Deduct.

Assets, liabilities, reserves, and capital, North Dakota pumping project, to June 30, 1917.

ASSETS.

Inventory of stock on hand:		
Stores issued and not used (mercantile store)	$320.94	
Storehouse stock	4,061.94	
Structural iron and steel	364.25	
Forage in stock	180.83	
Fuel	659.90	
Products of local operations	53.32	
Freight and handling on inventory property	44.15	
		$5,685.33
Accounts receivable:		
Construction charges due and uncollected from water-right applicants	39,396.57	
Construction charges unaccrued on contracts with water-right applicants	231,023.97	
Operation and maintenance charges due and uncollected from water-right applicants	11,314.63	
Uncollected rentals of power and light	2,458.00	
Uncollected rentals of irrigation water	799.55	
		284,992.72
Construction work in process:		
Gross cost of construction of project to date	739,880.25	
Less revenues earned during construction, as follows:		
Rentals of buildings $347.16		
Rentals of irrigation water 196.75		
Contractors' freight refunds 5,495.08		
Total deductions	6,038.99	
Net cost of construction of project to date		733,841.26
Deferred operation and maintenance charges		204,784.21
Total assets		1,229,303.52

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:		
Unpaid labor	$1,825.92	
Unpaid purchases	441.34	
Unpaid freight and express charges	97.05	
Unpaid passenger fares	33.10	
		$2,397.41
Reserves for repayment to reclamation fund of cost of project:		
Value of construction contracts with water-right applicants	278,359.09	
Value of construction contracts with water-right applicants temporarily suspended	731.09	
Construction charges paid in advance by water-right applicants	16.43	
Construction charges paid and forfeited by water-right applicants	202.40	
Penalties paid on construction charges by water-right applicants	15.81	
Net power revenues	5,475.19	
		284,800.01
Capital investment:		
Disbursement vouchers $1,063,980.82		
Transfer vouchers received from other projects 199,861.98		
	1,263,842.80	

Capital investment—Continued.		
Less—		
Collections	$138,175.54	
Collection vouchers, repayment refunds	153.00	
Transfer vouchers issued to other projects	183,408.16	
		$321,736.70
Net investment		$942,106.10
Total liabilities, reserves, and capital investments of the Government		1,229,303.52

Operating expenses and revenues, North Dakota pumping project, to June 30, 1917.

EXPENSES.

Feature.	Fiscal year 1917.			To end of fiscal year 1917.		
	Operation.	Maintenance.	Total.	Operation.	Maintenance.	Total.
Pumping for irrigation:						
Williston pumping station No. 1				$240.88	$76.25	$317.13
Williston pumping station No. 2				3,177.70	780.51	3,958.21
Williston pumping station No. 3		$157.88	$157.88	21,961.17	4,655.99	26,617.16
Williston pumping station No. 4		3.33	3.33	2,349.36	468.54	2,817.90
Buford-Trenton pumping station No. 1				23,650.16	3,427.18	27,077.34
Buford-Trenton pumping station No. 2		221.15	221.15	27,044.49	5,851.96	32,896.45
Power plant irrigation		200.50	200.50	94,884.90	23,488.79	118,373.69
Williston transmission line	[1] 5.00	25.87	20.87	809.40	639.05	1,448.45
Buford-Trenton transmission line		41.25	41.25	3,572.32	1,892.38	5,464.70
Buildings		157.19	157.19		4,592.17	4,592.17
Williston telephone system				596.27	219.06	815.33
Buford-Trenton telephone system				1,087.27	155.13	1,242.40
Plant accounts—						
Corral					984.81	984.81
Mess					258.89	258.89
Office and engineering					786.49	786.49
Miscellaneous equipment and tools					1,390.70	1,390.70
Total pumping for irrigation	[1] 5.00	807.17	802.17	179,373.92	49,667.90	229,041.82
Lateral system:						
Williston		7.50	7.50	17,369.35	10,713.74	28,083.09
Buford-Trenton				7,100.90	1,528.77	8,629.67
Plant					560.88	560.88
Total lateral system		7.50	7.50	24,470.25	12,803.39	37,273.64
Commercial power, preparatory				9,330.54		9,330.54
Total	[1] 5.00	814.67	809.67	213,174.71	62,471.29	275,646.00

REVENUES.

Item.	Fiscal year 1917.	To end of fiscal year 1917.
Operation and maintenance charges accrued on contract with water-right applicants		$24,340.51
Operation and maintenance charges paid in advance by water-right applicants		101.20
Operation and maintenance charges paid and forfeited by water-right applicants		156.27
Penalties on operation and maintenance charges accrued on contracts with water-right applicants	$1.32	45.41
Rental of land and buildings during operating period	404.70	2,404.53
Rental of grazing and farming lands during operating period	202.62	202.62
Rental of power and light during operating period (employees)	21.15	21.15
Rental of irrigation water	16.52	2,751.83
Accrued and unpaid operation and maintenance accruals transferred to and added to construction charges		22,191.93
Other revenues unclassified, earned during operating period	1,774.08	18,646.34
Total	2,420.39	70,861.79
Difference (excess and deficit)	[1] 1,610.72	204,784.21

[1] Excess.

Assets, liabilities, reserves, and capital, Lawton project, to June 30, 1917.

ASSETS.

Inventory of stock on hand: Freight and handling on inventory property, equipment adjustment account			[1] $44.24
Construction work in progress:			
Gross cost of construction of project to date	$13,193.37		
Plant accounts	452.58		
		$13,645.95	
Less cost adjustments—Profit on hospital operations	9.75		
Total deductions		9.75	
Net cost of construction of project to date			13,636.20
Total assets			13,591.96

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid purchases		$84.00	
Unpaid freight and express charges		2.46	
Unpaid passenger fares		159.35	
			$245.81
Capital investment:			
Disbursement vouchers	$11,512.28		
Transfer vouchers received from other projects	2,433.07		
		13,945.35	
Less—			
Collections	.20		
Transfer vouchers issued to other projects	599.00		
		599.20	
Net investment			13,346.15
Total liabilities, reserves, and capital investments of the Government			13,591.96

Assets, liabilities, reserves, and capital, Umatilla project, to June 30, 1917.

ASSETS.

Cash: Cash in special deposit account		$1,160.08
Inventory of stock on hand:		
Stores issued and not used	$138.76	
Storehouse stock	6,094.61	
Cement	4,534.22	
Lumber	995.97	
Explosives	23.01	
Forage in stock	1,034.34	
Fuel	62.71	
Products of local operations	4,399.74	
Freight and handling on inventory property	[1] 59.68	
		17,223.68

[1] Deduct.

Accounts receivable:			
Construction charges due and uncollected from water right applicants		$16,526.40	
Construction charges unaccrued on contracts with water right applicants		965,580.16	
Operation and maintenance charges due and uncollected from water-right applicants		16,838.82	
Uncollected rentals of grazing and farming lands		3.00	
Uncollected rentals of irrigation water		523.41	
Other uncollected items unclassified		72.50	
			$999,544.29
Construction work in process:			
Gross cost of construction of project to date	$2,307,989.97		
Gross supplemental construction cost of project to date	31,463.65		
Unadjusted clearing accounts	2,714.71		
Plant accounts	5,772.99		
		2,347,941.32	
Less revenues earned during construction, as follows—			
Rentals of buildings	5,041.25		
Rentals of grazing and farming lands	22,011.96		
Rentals of irrigation water	80.00		
Contractors' freight refunds	1,055.31		
Forfeitures by defaulting bidders and contractors	100.00		
Other revenues, unclassified	10,060.00		
Less cost adjustments—			
Profit on mess house operations	2,115.49		
Profit on mercantile store operations	7.75		
Loss on hospital operations	[1] 205.13		
Total deductions		40,266.63	
Net cost of construction of project to date			2,307,674.69
Operation and maintenance deficit			128,945.60
Total assets			3,454,548.34

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid contract holdbacks		$35.00	
Unpaid labor		7,188.46	
Unpaid purchases		1,160.98	
Unpaid freight and express charges		3,951.97	
Unpaid passenger fares		55.20	
Guarantee and special deposits		1,160.08	
			$13,551.69
Reserves for repayment to reclamation fund of cost of project:			
Value of construction contracts with water right applicants		1,053,631.56	
Value of construction contracts with water right applicants temporarily suspended		121,799.00	
Construction charges paid in advance by water right applicants		27,491.42	
Construction charges paid and forfeited by water right applicants		4,068.72	
Penalties paid on construction charges by water right applicants		1,648.81	
			1,208,639.51

Capital investment:			
Disbursement vouchers	$2,647,158.90		
Transfer vouchers received from other projects	89,840.67		
		$2,736,999.57	
Less—			
Collections	409,333.89		
Collection vouchers, repayment refunds	72.55		
Transfer vouchers issued to other projects	95,235.99		
		504,642.43	
Net investment			$2,232,357.14
Total liabilities, reserves, and capital investments of the Government			3,454,548.34

Operating expenses and revenues, Umatilla project, to June 30, 1917.

EXPENSES.

Feature.	Fiscal year, 1917.			To end of fiscal year 1917.		
	Operation.	Maintenance.	Total.	Operation.	Maintenance.	Total.
Storage works: East side	$3,672.19	$663.50	$4,335.69	$50,709.16	$43,821.65	$94,530.81
Canal system: West extension	955.15	4,751.34	5,706.49	1,036.95	5,570.73	6,607.68
Lateral system:						
East side	5,357.26	9,927.06	15,284.32	44,679.30	106,528.11	151,207.41
West extension	1,440.33	1,710.86	3,151.19	1,676.16	2,030.31	3,706.47
	6,797.59	11,637.92	18,435.51	46,355.46	108,558.42	154,913.88
Drainage system (east side)		1,265.90	1,265.90		7,779.20	7,779.20
Undistributed expenses:						
General expense, superintendence, engineering, hydrography	1,900.76	3,182.80	5,083.56	1,900.76	3,182.80	5,083.56
Telephone line maintenance		122.44	122.44		122.44	122.44
Payment damage claims		688.00	688.00		688.00	688.00
	1,900.76	3,993.24	5,894.00	1,900.76	3,993.24	5,894.00
Total	13,325.69	22,311.90	35,637.59	100,002.33	169,723.24	269,725.57

REVENUES.

Item.	Fiscal year 1917.	To end of fiscal year 1917.
Operation and maintenance charges accrued on contracts with water-right applicants	$17,549.20	$102,305.84
Operation and maintenance charges paid in advance by water-right applicants	[1] 970.19	2,390.60
Operation and maintenance charges paid and forfeited by water-right applicants	8.00	1,198.23
Penalties on operation and maintenance charges accrued on contracts with water-right applicants	747.38	1,436.51
Discount allowed on operation and maintenance charges accrued on contracts with water-right applicants	[1] 314.31	[1] 503.49
Rental of irrigation water	4,897.66	13,375.60
Accrued and unpaid operation and maintenance accruals transferred to and added to construction charges	77.02	19,524.80
Other revenues unclassified, earned during operating period	358.84	1,051.88
Total	22,353.60	140,779.97
Difference (deficit)	13,283.99	128,945.60

[1] Deduct.

Assets, liabilities, reserves, and capital, Klamath project, to June 30, 1917.

ASSETS.

Cash: Cash in special deposit accounts			$525.16
Inventory of stock on hand:			
Storehouse stock		$10,947.30	
Cement		322.98	
Structural iron and steel		2,492.55	
Lumber		1,981.82	
Explosives		1,457.84	
Forage in stock		926.86	
Fuel		1,351.72	
Equipment adjustment		230.59	
Freight and handling on inventory property		[1] 2,711.30	
			17,000.36
Accounts receivable:			
Construction charges due and uncollected from water-right applicants		2,383.06	
Construction charges unaccrued on contracts with water-right applicants		1,060,857.27	
Operation and maintenance charges due and uncollected from water-right applicants		4,949.47	
Unadjusted transfers to other projects		110.21	
			1,068,300.01
Construction work in progress:			
Gross cost of construction of project to date	$2,641,241.06		
Gross supplemental construction cost of project to date	160,007.87		
Gross operation and maintenance cost during construction	30,347.18		
Unadjusted clearing accounts	151.43		
Plant accounts	29,215.18		
		2,860,962.72	
Less revenues earned during construction, as follows—			
Rentals of buildings	229.50		
Rentals of grazing and farming lands	9,029.02		
Rentals of power and light	1,020.00		
Rentals of irrigation water	31,821.45		
Contractors' freight refunds	8,555.71		
Other revenues, unclassified	902.05		
Less cost adjustments—			
Loss on mess-house operations	[1] 1,710.85		
Profit on mercantile store operations	892.26		
Profit on hospital operations	532.05		
Total deductions		51,271.19	
Net cost of construction of project to date			2,809,691.53
Operation and maintenance deficit			68,142.20
Total assets			3,963,659.26

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid labor		$9,499.73	
Unpaid purchases		5,326.46	
Unpaid freight and express charges		1,400.53	
Unpaid passenger fares		319.12	
Unpaid agreements to purchase real property		2,565.50	
			$19,111.34

[1] Deduct.

Contingent obligations:			
Guaranty deposits			$525.16
Reserves for repayment to reclamation fund of cost of project:			
Value of construction contracts with water-right applicants		$1,354,167.25	
Value of construction contracts with water-right applicants temporarily suspended		9,960.00	
Construction charges paid in advance by water-right applicants		4,171.69	
Construction charges paid and forfeited by water-right applicants		9.00	
Penalties paid on construction charges by water-right applicants		758.20	
			1,369,066.14
Capital investment:			
Disbursement vouchers	$3,042,459.46		
Joint construction vouchers received	6,705.07		
Transfer vouchers received from other projects	96,177.56		
		3,145,342.09	
Less—			
Collections	530,317.44		
Collection vouchers, repayment refunds	1,488.25		
Joint construction vouchers issued	6,705.07		
Transfer vouchers issued to other projects	31,874.71		
		570,385.47	
Net investment			2,574,956.62
Total liabilities, reserves, and capital investments of the Government			3,963,659.26

Operating expenses and revenues, Klamath project, to June 30, 1917.

EXPENSES.

Feature.	Fiscal year 1917.			To end of fiscal year 1917.		
	Operation.	Maintenance.	Total.	Operation.	Maintenance.	Total.
Canal system:						
First unit	$4,085.36	$9,209.05	$13,294.41	$29,845.50	$38,630.54	$68,476.04
Second unit	533.44	1,721.14	2,254.58	533.44	1,721.14	2,254.58
Third unit	77.79	1,074.67	1,152.46	77.79	1,074.67	1,152.46
	4,696.59	12,004.86	16,701.45	30,456.73	41,426.35	71,883.08
Lateral system:						
First unit	2,514.49	6,737.89	9,252.38	39,664.97	107,684.64	147,349.61
Second unit	260.43	526.67	787.10	260.43	526.67	787.10
Third unit	52.48	2,128.14	2,180.62	52.48	2,128.14	2,180.62
	2,827.40	9,392.70	12,220.10	39,977.88	110,339.45	150,317.33
Drainage: First unit		62.08	62.08		62.08	62.08
Flood protection: First unit		596.29	596.29		10,792.63	10,792.63
Supplemental construction chargeable to operation and maintenance					16,597.10	16,597.10
Total	7,523.99	22,055.93	29,579.92	70,434.61	179,217.61	249,652.22

Operating expenses and revenues, Klamath project, to June 30, 1917—Continued.

REVENUES.

Item.	Fiscal year 1917.	To end of fiscal year 1917.
Operation and maintenance charges accrued on contracts with water-right applicants	$27,411.92	$177,138.79
Operation and maintenance charges paid in advance by water-right applicants	.....	400.03
Operation and maintenance charges paid and forfeited by water-right applicants	.....	3.75
Penalties on operation and maintenance charges accrued on contracts with water-right applicants	381.12	451.79
Discount allowed on operation and maintenance charges accrued on contracts with water-right applicants	[1] 842.94	[1] 1,985.76
Rental of land and buildings during operating period	366.00	366.00
Rentals of irrigation water	591.76	3,826.76
Accrued and unpaid operation and maintenance accruals transferred to and added to construction charges	.....	1,269.95
Other revenue unclassified, earned during operating period	.....	38.71
Total	27,907.86	181,510.02
Difference (deficit)	1,672.06	68,142.20

[1] Deduct.

Assets, liabilities, reserves, and capital, Belle Fourche project, to June 30, 1917.

ASSETS.

Cash: Cash in special deposit account		$1,914.09
Inventory of stock on hand:		
Stores issued and not used	$324.61	
Storehouse stock	9,661.28	
Cement	1,704.66	
Structural iron and steel	327.02	
Lumber	5,117.97	
Forage in stock	1,658.53	
Fuel	71.76	
Freight and handling on inventory property	199.13	
		19,064.96
Accounts receivable:		
Construction charges due and uncollected from water-right applicants	19,649.08	
Construction charges unaccrued on contracts with water-right applicants	1,895,744.06	
Operation and maintenance charges due and uncollected from water-right applicants	35,861.51	
Other uncollected items unclassified	2,056.83	
		1,953,311.48
Construction work in process:		
Gross cost of construction of project to date	$3,440,650.26	
Plant accounts	15,909.53	
	3,456,559.79	
Less revenues earned during construction, as follows:		
Rentals of buildings	4,248.40	
Rentals of grazing and farming lands	2,661.90	
Rentals of telephones and tolls	87.48	
Contractors' freight refunds	2,883.92	
Forfeitures by defaulting bidders and contractors	8,643.48	
Other revenues, unclassified	46.50	

Construction work in process—Continued.			
Less cost adjustments—			
Loss on mess house operations	[1] $3,992.93		
Profit on mercantile store operations	1,741.08		
Profit on hospital operations	2,709.59		
Total deductions		$19,029.42	
Net cost of construction of project to date			$3,437,530.37
Operation and maintenance deficit			210,133.59
Total assets			5,621,954.49

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid progress earnings under construction contracts		$6,453.20	
Unpaid contract holdbacks		1,000.00	
Unpaid labor		5,685.22	
Unpaid purchases		4,483.20	
Unpaid freight and express charges		1,211.17	
Unpaid passenger fares		100.95	
Other unpaid items unclassified		20.53	
			$18,954.27
Contingent obligations: Guarantee and special deposits			1,914.09
Reserves for repayment to reclamation fund of cost of project:			
Value of construction contracts with water-right applicants		2,073,382.85	
Value of construction contracts with water-right applicants temporarily suspended		52,276.40	
Construction charges paid in advance by water-right applicants		412.30	
Construction charges paid and forfeited by water-right applicants		655.15	
Penalties paid on construction charges by water-right applicants		4,578.71	
Receipts from sale of town lots		55,616.97	
			2,186,922.36
Capital investment:			
Disbursement vouchers	$3,828,227.61		
Transfer vouchers received from other projects	106,316.24		
		3,934,543.83	
Less—			
Collections	486,464.33		
Collection vouchers, repayment refunds	265.87		
Transfer vouchers issued to other projects	37,988.56		
		524,718.76	
Net investment			3,409,825.09
Revenue in excess of cost of operation and maintenance			4,338.68
Total liabilities, reserves, and capital investments of the Government			5,621,954.49

[1] Deduct.

Operating expenses and revenues, Belle Fourche project, to June 30, 1917.

EXPENSES.

Feature.	Fiscal year 1917.			To end of fiscal year 1917.		
	Operation.	Maintenance.	Total.	Operation.	Maintenance.	Total.
Storage works				$15,409.98	$50,562.71	$65,972.69
Diversion dam	$1,008.76	$2,541.14	$3,549.90			
Storage dam	764.33	1,492.78	2,257.11			
	1,773.09	4,033.92	5,807.01			
Canal system				25,998.26	78,317.60	104,315.86
North canal	2,620.16	7,461.35	10,081.51			
South canal	2,169.60	6,688.33	8,857.93			
	4,789.76	14,149.68	18,939.44			
Lateral system				45,762.26	175,142.30	220,904.56
North laterals	3,121.51	19,975.72	23,097.23			
South laterals	3,384.76	10,929.34	14,314.10			
Johnson lateral	1,216.21	4,015.22	5,231.43			
	7,722.48	34,920.28	42,642.76			
Drainage system					3,624.44	3,624.44
Undistributed expenses				1,182.17	3,338.91	4,521.08
Telephone maintenance		438.44	438.44			
Buildings maintenance		743.78	743.78			
Hydrography	1,182.17		1,182.17			
Plant accounts		2,156.69	2,156.69			
	1,182.17	3,338.91	4,521.08			
Supplemental construction chargeable to operation and maintenance		32,530.86	32,530.86		35,593.32	35,593.32
Plant accounts					2,156.69	2,156.69
Total	15,467.50	88,973.65	104,441.15	88,352.67	348,735.97	437,088.64

REVENUES.

Item.	Fiscal year 1917.	To end of fiscal year. 1917.
Operation and maintenance charges accrued on contracts with water-right applicants	$55,098.82	$211,250.25
Operation and maintenance charges paid in advance by water-right applicants	[1] 175.47	.36
Operation and maintenance charges paid and forfeited by water-right applicants	4.80	508.65
Penalties on operation and maintenance charges accrued on contracts with water-right applicants	1,236.94	1,718.32
Discount allowed on operation and maintenance charges accrued on contracts with water-right applicants (contra)	[1] 1,128.01	[1] 1,942.76
Rental of land and buildings during operating period	1,210.15	1,640.15
Rental of grazing and farming lands during operating period	180.80	180.80
Rentals of irrigation water	60.00	1,934.14
Accrued and unpaid operation and maintenance accruals transferred to and added to construction charges	2,417.06	15,420.23
Other revenues, unclassified, earned during operating period	562.54	583.59
Total	59,467.63	231,293.73
Difference (deficit)	44,973.52	205,794.91

[1] Deduct.

Assets, liabilities, reserves, and capital, Strawberry Valley project, to June 30, 1917.

ASSETS.

Cash:			
In special fiscal agent's possession, awaiting remittance		$16.55	
In special deposit account		10,735.74	
			$10,752.29
Inventory of stock on hand:			
Storehouse stock		22,022.61	
Storehouse adjustment account		[1] 4,088.77	
Products of local operations		736.31	
Freight and handling on inventory property		[1] 2,352.90	
			16,317.25
Accounts receivable:			
Construction charges due and uncollected from water-right applicants		2,074.73	
Construction charges unaccrued on contracts with water-right applicants		1,738,856.68	
Operation and maintenance charges due and uncollected from water-right applicants		1,400.74	
Uncollected rentals of power and light		1,082.85	
Other uncollected items, unclassified		6,091.24	
Unadjusted transfers to other projects		1,666.22	
			1,751,172.46
Construction work contracted: Unearned value of construction work contracted			13,000.00
Construction work in process:			
Gross cost of construction of project to date	$3,367,673.00		
Gross operation and maintenance cost during construction	12,511.90		
Plant accounts	4,344.49		
		3,384,529.39	
Less revenues earned during construction, as follows—			
Rentals of buildings	5,675.80		
Rentals of irrigation water	400.00		
Rentals of telephones and tolls	1,318.82		
Contractors' freight refunds	586.36		
Forfeitures by defaulting bidders and contractors	270.00		
Other revenues, unclassified	20,519.37		
Less cost adjustments—			
Profit on mess-house operations	5,026.11		
Profit on mercantile store operations	9,249.70		
Loss on hospital operations	[1] 3,271.96		
Total deductions		39,774.20	
Net cost of construction of project to date			3,344,755.19
Operation and maintenance deficit			14,086.67
Total assets			5,150,083.86

[1] Deduct.

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid progress earnings under construction contracts		$21,781.78	
Unpaid contract holdbacks		12,366.05	
Unpaid labor		6,956.33	
Unpaid purchases		443.64	
Unpaid freight and express charges		3,039.20	
Unpaid passenger fares		13.90	
Unpaid agreements to purchase real property		197.97	
Unredeemed coupon books		73.05	
Guaranty and special deposits		10,735.74	
Other unpaid items, unclassified		315.70	
			$55,923.36
Contingent obligations: Unearned value of construction work contracted			13,000.00
Reserves for repayment to reclamation fund of cost of project:			
Value of construction contracts with water-right applicants		1,657,946.49	
Value of construction contracts with water-right applicants temporarily suspended		130,365.60	
Construction charges paid in advance by water-right applicants		979.92	
Net power revenues		[1] 2,516.24	
Penalties paid on construction charges by water-right applicants		121.74	
Net grazing revenues		39,273.80	
			1,826,171.31
Capital investment:			
Disbursement vouchers	$3,477,091.39		
Transfer vouchers received from other projects	134,535.63		
		3,611,627.02	
Less—			
Collections	302,414.34		
Transfer vouchers issued to other projects	54,223.49		
		356,637.83	
Net investment			3,254,989.19
Total liabilities, reserves, and capital investments of the Government			5,150,083.86

[1] Deduct.

Operating expenses and revenues, Strawberry Valley project, to June 30, 1917.

EXPENSES.

Feature.	Fiscal year 1917.			To end of fiscal year 1917.		
	Operation.	Maintenance.	Total.	Operation.	Maintenance.	Total.
Storage works:						
Strawberry Dam	$444.40	$3,139.52	$3,583.92	$444.40	$4,814.49	$5,258.89
Indian Creek Dike	76.56	103.49	180.05	76.56	680.60	757.16
Indian Creek feeder canal	461.51	223.83	685.34	871.08	371.39	1,242.47
Trail Hollow feeder canal	505.56	133.04	638.60	852.54	186.69	1,039.23
Strawberry tunnel	1,533.25	263.54	1,796.79	2,388.42	954.61	3,343.03
West portal weir	.....	22.40	22.40	.....	22.40	22.40
	3,021.28	3,885.82	6,907.10	4,633.00	7,030.18	11,663.18
Canal system:						
High Line Canal	258.40	40.02	298.42	569.34	40.02	609.36
High Line Canal and laterals	41.85	.....	41.85	279.35	.....	279.35
West portal watercourse	41.50	717.12	758.62	41.50	717.12	758.62
West portal measure flume	94.00	2,422.35	2,516.35	106.86	3,073.04	3,179.90
Spanish Fork diversion dam	31.26	.....	31.26	31.26	.....	31.26
Main distributory and power canal	1,166.12	1,491.29	2,657.41	1,166.12	1,491.29	2,657.41
	1,633.13	4,670.78	6,303.91	2,194.43	5,321.47	7,515.90
Undistributed expenses:						
Telephone line maintenance	.....	2,478.77	2,478.77	.....	2,737.47	2,737.47
Camp maintenance	.....	283.26	283.26	.....	283.26	283.26
Superintendence and accounts	345.04	.....	345.04	345.04	.....	345.04
Engineering and inspection	8.33	.....	8.33	8.33	.....	8.33
General expense	[1]7,905.46	.....	[1]7,905.46	1,664.85	.....	1,664.85
Hydrometry	3,679.38	.....	3,679.38	7,403.70	.....	7,403.70
Experimental surveys	[1]321.89	.....	[1]321.89	238.41	.....	238.41
Diamond Fork road maintenance	.....	3,223.63	3,223.63	.....	4,644.93	4,644.93
	[1]4,194.60	5,985.66	1,791.06	9,660.33	7,665.66	17,325.99
Total	459.81	14,542.26	15,002.07	16,487.76	20,017.31	36,505.07

[1] Deduct.

REVENUES.

Item.	Fiscal year 1917.	To end of fiscal year 1917.
Operation and maintenance charges accrued on contracts with water-right applicants	$15,810.87	$21,252.46
Operation and maintenance charges paid in advance by water-right applicants	14.90	14.90
Penalties on operation and maintenance charges accrued on contracts with water-right applicants	25.04	26.77
Discounts allowed on operation and maintenance charges on contracts with water-right applicants	[1]567.23	[1]791.69
Rental of lands and buildings during operating period	459.00	934.00
Rentals of irrigating water during operating period	357.63	697.63
Rental of telephone tolls during operating period	216.16	284.33
Total	16,316.37	22,418.40
Difference (excess and deficit)	1,314.30	[1]14,086.67

[1] Deduct.

Assets, liabilities, reserves, and capital, Okanogan project, to June 30, 1917.

ASSETS.

Inventory of stock on hand:		
Storehouse stock	$1,277.35	
Cement	259.04	
Structural iron and steel	509.12	
Lumber	495.66	
		$2,541.17

Accounts receivable:			
Construction charges due and uncollected from water-right applicants		$22.40	
Construction charges unaccrued on contracts with water-right applicants		764,187.41	
Operation and maintenance charges due and uncollected from water-right applicants		117.09	
Uncollected rentals of power and light		564.39	
Uncollected rentals of irrigation water		13,194.84	
Other uncollected items unclassified		558.73	
Unadjusted transfers to other projects		47.00	
			$778,691.86
Construction work in process:			
Gross cost of construction of project to date	$837,191.96		
Gross operation and maintenance cost during construction	4,736.36		
Plant accounts	1,314.47		
		843,242.79	
Less revenues earned during construction, as follows—			
Rentals of buildings	224.00		
Rentals of grazing and farming lands	540.00		
Rentals of irrigation water	1,670.50		
Less cost adjustments—			
Loss on mess house operations	[1] 193.83		
Profit on hospital operations	233.58		
Headquarters farm net results	[1] 7.73		
Total deductions		2,466.52	
Net cost of construction of project to date			840,776.27
Total assets			1,622,009.30

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid labor		$2,774.89	
Unpaid purchases		334.67	
Unpaid freight and express charges		56.67	
Unpaid passenger fares		61.60	
Unpaid agreements to purchase real property		4,875.00	
			8,102.83
Reserves for repayment to reclamation fund of cost of project:			
Value of construction contracts with water-right applicants		780,859.00	
Construction charges paid in advance by water-right applicants		8,033.00	
Penalties paid on construction charges by water-right applicants		1.21	
			788,893.21
Net power revenues			320.00
Capital investment:			
Disbursement vouchers	$916,592.63		
Transfer vouchers received from other projects	40,683.82		
		957,276.45	
Less—			
Collections	163,925.43		
Collection vouchers, repayment refunds	52.50		
Transfer vouchers issued to other projects	11,025.41		
		175,003.34	
Net investment			782,273.11
Revenue in excess of cost of operation and maintenance			42,420.15
Total liabilities, reserves, and capital investments of the Government			1,622,009.30

[1] Deduct.

Operating expenses and revenues, Okanogan project, to June 30, 1917.

EXPENSES.

Feature.	Fiscal year 1917.			To end of fiscal year 1917.		
	Operation.	Maintenance.	Total.	Operation.	Maintenance.	Total.
Storage works:						
Salmon Lake Reservoir	$314.22	$88.01	$402.23	$1,094.20	$140.97	$1,235.17
Conconully Reservoir	2,053.30	32.06	2,085.36	7,742.63	749.00	8,491.63
	2,367.52	120.07	2,487.59	8,836.83	889.97	9,726.80
Lateral system:						
Diversion Dam					71.94	71.94
Private ditch diversions		232.97	232.97		862.30	862.30
South Side Canal	115.66	37.18	152.84	115.66	37.18	152.84
Main Canal	854.36	835.02	1,689.38	4,090.88	6,626.25	10,717.13
Upper main lateral	2,298.45	3,584.63	5,883.08	11,592.83	21,516.20	33,109.03
Lower main lateral	1,329.51	1,454.77	2,784.28	7,739.95	14,125.02	21,864.97
	4,597.98	6,144.57	10,742.55	23,539.32	43,238.89	66,778.21
Undistributed expenses:						
Buildings		8.06	8.06		2,219.13	2,219.13
General expense				8,461.35	13,349.47	21,810.82
		8.06	8.06	8,461.35	15,568.60	24,029.95
Undistributed clearing account					321.38	321.38
Total	6,965.50	6,272.70	13,238.20	40,837.50	60,018.84	100,856.34

REVENUES.

Item.	Fiscal year 1917.	To end of fiscal year 1917.
Operating and maintenance charges accrued	$859.90	$37,167.23
Penalties on operating and maintenance charges	2.05	2.05
Discount on operating and maintenance charges	[1] 9.20	[1] 9.20
Rental of land and buildings	225.95	1,893.07
Rentals of irrigation water	16,989.86	104,200.52
Other revenues unclassified	22.82	22.82
Total revenues	18,091.38	143,276.49
Excess of revenues over expenses	4,853.18	42,420.15

[1] Deduct.

Assets, liabilities, reserves, and capital, Yakima project storage unit, June 30, 1917.

ASSETS.

Cash: In special fiscal agent's possession, awaiting remittance		$674.45
Inventory of stock on hand:		
Stores issued and not used	$20,273.67	
Storehouse stock	158,241.39	
Cement	7,221.42	
Structural iron and steel	25.54	
Lumber	18,463.37	
Explosives	8,774.05	
Forage in stock	7,133.04	
Fuel	3,263.04	
Products of local operations	240.28	
		223,635.80
Accounts receivable:		
Construction charges unaccrued on contracts with water-right applicants	352,866.00	
Operation and maintenance charges due and uncollected from water-right applicants	130.68	
Unadjusted transfers to other projects	540.93	
		353,537.61

Construction work in process:			
Gross cost of construction of project to date	$2,715,166.69		
Gross operation and maintenance cost during construction	9,899.36		
Plant accounts and unadjusted clearing accounts	148,528.97		
		$2,873,595.02	
Less revenues earned during construction, as follows—			
Rentals of buildings	26,869.70		
Rentals of grazing and farming lands	51.00		
Rentals of power and light	1,766.13		
Rentals of irrigation water	4,305.00		
Rentals of telephones and tolls	34.20		
Other revenues, unclassified	67,345.77		
Less cost adjustments—			
Profit on mess house operations	33,040.64		
Profit on mercantile store operations	16,168.97		
Profit on hospital operations	2,065.32		
Total deductions		151,646.73	
Net cost of construction of project to date			$2,721,948.29
Total assets			3,299,796.15

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid labor		$32,723.04	
Unpaid purchases		83,294.19	
Unpaid freight and express charges		15,572.58	
Unpaid passenger fares		250.42	
Unredeemed coupon books		763.50	
Unadjusted transfers from other projects		28.39	
Other unpaid items unclassified		618.61	
			$133,250.73
Reserves for repayment to reclamation fund of cost of project:			
Value of construction contracts with water-right applicants		664,870.00	
Penalties paid on construction charges by water-right applicants		1.35	
			664,871.35
Capital investment:			
Disbursement vouchers	$2,711,186.97		
Transfer vouchers received from other projects	256,806.87		
		2,967,993.84	
Less—			
Collections	421,490.32		
Transfer vouchers issued to other projects	45,240.82		
		466,731.14	
Net investment			2,501,262.70
Revenue in excess of cost of operation and maintenance			411.37
Total liabilities, reserves, and capital investments of the Government			3,299,796.15

Assets, liabilities, reserves, and capital, Yakima project, Sunnyside unit, to June 30, 1917.

ASSETS.

Cash:			
In special fiscal agent's possession, awaiting remittance		$1.20	
In other employees' hands, awaiting transfer to special fiscal agents		3,406.92	
			$3,408.12
Inventory of stock on hand:			
Storehouse stock		14,417.25	
Cement		4,267.55	
Lumber		1,299.94	
Explosives		214.22	
Forage in stock		30.87	
Fuel		24.56	
Freight and handling on inventory property		[1] 1,955.85	
			18,298.54
Accounts receivable:			
Construction charges due and uncollected from water-right applicants		33,178.45	
Construction charges unaccrued on contracts with water-right applicants		2,299,560.80	
Operation and maintenance charges due and uncollected from water-right applicants		38,194.15	
Uncollected freight refunds		383.59	
Unadjusted transfers to other projects		3,807.87	
			2,375,124.86
Construction work contracted: Unearned value of construction work contracted			14,726.55
Construction work in progress:			
Gross cost of construction of project to date	$3,138,900.55		
Gross supplemental construction cost of project to date	2,606.40		
Plant accounts	9,983.89		
		3,151,490.84	
Less revenues earned during construction, as follows:			
Rentals of buildings	3,924.09		
Contractor's freight refunds	10,959.63		
Forfeitures by defaulting bidders and contractors	5,391.16		
Less cost adjustments—			
Profit on mess house operations	2,602.86		
Profit on mercantile store operations	2,917.75		
Profit on hospital operations	1,409.31		
Total deductions		27,204.80	
Net cost of construction of project to date			3,124,286.04
Operation and maintenance deficit			38,447.93
Total assets			5,574,292.04

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:		
Unpaid contract holdbacks	$7,203.15	
Unpaid labor	11,655.42	
Unpaid purchases	2,797.02	
Unpaid freight and express charges	5,109.17	
Unpaid passenger fares	190.23	
Unpaid agreements to purchase real property	100.00	
Other unpaid items unclassified	3,406.92	
		$30,461.91

[1] Deduct.

Contingent obligations: Unearned value of construction work contracted			$14,726.55
Reserves for repayment to reclamation fund of cost of project:			
Value of construction contracts with water-right applicants		$3,048,248.35	
Value of construction contracts with water-right applicants temporarily suspended		9,479.60	
Construction charges paid in advance by water-right applicants		15,665.79	
Construction charges paid and forfeited by water-right applicants		216.92	
Penalties paid on construction charged by water-right applicants		7,212.35	
			3,080,823.01
Allowance irrigation district account Washington Irrigation Co. water right			[1] 6,145.04
Capital investment:			
Disbursement vouchers	$3,943,087.31		
Transfer vouchers received from other projects	72,549.49		
		4,015,636.80	
Less—			
Collections	1,469,072.09		
Collection vouchers, repayment refunds	2,630.58		
Transfer vouchers issued to other projects	89,508.52		
		1,561,211.19	
Net investment			2,454,425.61
Total liabilities, reserves, and capital investments of Government			5,574,292.04

Operating expenses and revenues, Yakima project, Sunnyside unit, to June 30, 1917.

EXPENSES.

Feature.	Fiscal year 1917.			To end of fiscal year 1917.		
	Operation.	Maintenance.	Total.	Operation.	Maintenance.	Total.
Storage work (proportion of cost)	$5,200.76	$1,543.19	$6,743.95	$6,465.67	$3,077.74	$9,543.41
Canal system:						
Diversion dam	592.57	.49	593.06	1,959.71	3,501.65	5,461.36
Main canal	9,223.06	25,188.79	34,411.85	100,787.10	125,162.25	225,949.35
Branch canals	3,970.66	12,352.26	16,322.92	37,269.36	94,754.95	132,024.31
Pipe lines	187.62	7,442.05	7,629.67	200.13	44,840.70	45,040.83
	13,973.91	44,983.59	58,957.50	140,216.30	268,259.55	408,475.85
Lateral system:						
Laterals	16,258.41	38,828.46	55,086.87	105,707.65	206,983.74	312,691.39
Wasteways	200.03	2,177.22	2,377.25	2,929.87	12,312.87	15,242.74
	16,458.44	41,005.68	57,464.12	108,637.52	219,296.61	327,934.13
Undistributed expenses:						
Telephone operation and maintenance	[1] 1,016.22	[1] 3,091.17	[1] 4,107.39			
General expense		[1] 29,329.63	[1] 29,329.63			
Maintenance, permanent improvements		2,308.45	2,308.45		22,991.90	22,991.90
Superintendence, irrigation districts	199.01		199.01	199.01		199.01
	[1] 817.21	[1] 30,112.35	[1] 30,929.56	199.01	22,991.90	23,190.91
Total	34,815.90	57,420.11	92,236.01	255,518.50	513,625.80	769,144.30

[1] Deduct.

Operating expenses and revenues, Yakima project, Sunnyside unit, to June 30, 1917—Con.

REVENUES.

Item.	Fiscal year 1917.	To end of fiscal year 1917.
Operation and maintenance charges accrued on contracts with water-right applicants	$84,323.62	$662,180.60
Operation and maintenance charges paid in advance by water-right applicants	170.78	627.22
Operation and maintenance charges paid and forfeited by water-right applicants	27.00	50.92
Penalties on operation and maintenance charges accrued on contracts with water-right applicants	1,802.67	7,478.63
Discount allowed on operation and maintenance charges accrued on contracts with water-right applicants	[1] 935.30	[1] 1,656.57
Rental of land and buildings during operating period	767.00	2,842.40
Rental of grazing and farming lands during operating period	15.00	30.00
Rentals of power and light during operating period	.....	1,869.20
Rentals of irrigation water	2,242.75	42,174.38
Rental of telephone and tolls during operating period	1.75	1.75
Accrued and unpaid operation and maintenance accruals transferred to and added to construction charges	3,173.52	13,887.77
Other revenues, unclassified, earned during operating period	25.25	1,210.07
Total	91,614.04	730,696.37
Difference (deficit)	621.97	38,447.93

Assets, liabilities, reserves, and capital, Yakima project, Tieton unit, to June 30, 1917.

ASSETS.

Inventory of stock on hand:		
Storehouse stock	$1,182.46	
Cement	1,570.51	
Structural iron and steel	1,844.00	
Lumber	262.74	
Explosives	17.77	
Forage in stock	445.85	
Fuel	132.65	
Products of local operations	696.76	
Freight and handling on inventory property	[1] 423.81	
		$5,728.93
Accounts receivable:		
Construction charges due and uncollected from water-right applicants	16,595.56	
Construction charges unaccrued on contracts with water-right applicants	2,494,569.07	
Operation and maintenance charges due and uncollected from water-right applicants	18,664.12	
		2,529,828.75
Construction work contracted: Unearned value of construction work contracted		4,440.00
Construction work in process:		
Gross cost of construction of project to date	$3,190,065.52	
Gross operation and maintenance cost during construction	10,208.54	
	3,200,274.06	
Less revenues earned during construction, as follows—		
Rentals of buildings	4,827.35	
Rentals of irrigation water	3,526.50	
Contractors' freight refunds	5,092.12	
Other revenues, unclassified	1,522.11	

[1] Deduct.

Construction work in process—Continued.			
Less cost adjustments—			
Loss on mess-house operations	[1] $1,155.75		
Profit on mercantile store operations	9,992.83		
Profit on hospital operations	2,495.49		
Total deductions		$26,300.65	
Net cost of construction of project to date			$3,173,973.41
Operation and maintenance deficit			8,439.54
Total assets			5,722,410.63

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid labor		$2,359.14	
Unpaid purchases		2,542.34	
Unpaid freight and express charges		797.29	
Unpaid passenger fares		50.10	
Unredeemed coupon books		17.15	
			$5,766.02
Contingent obligations: Unearned value of construction work contracted			4,440.00
Reserves for repayment to reclamation fund of cost of project:			
Value of construction contracts with water-right applicants		2,819,480.96	
Value of construction contracts with water-right applicants temporarily suspended		14,415.00	
Construction charges paid in advance by water-right applicants		285.86	
Construction charges paid and forfeited by water-right applicants		21.60	
Penalties paid on construction charges by water-right applicants		5,122.23	
			2,839,325.65
Capital investment:			
Disbursement vouchers	$3,326,405.88		
Transfer vouchers received from other projects	470,392.64		
		3,796,798.52	
Less—			
Collections	592,047.31		
Collection vouchers, repayment refunds	762.60		
Transfer vouchers issued to other projects	331,109.65		
		923,919.56	
Net investment			2,872,878.96
Total liabilities, reserves, and capital investments of the Government			5,722,410.63

[1] Deduct.

Operating expenses and revenues Yakima project, Tieton unit, to June 30, 1917.

EXPENSES.

Feature.	Fiscal year 1917.			To end of fiscal year 1917.		
	Operation.	Maintenance.	Total.	Operation.	Maintenance.	Total.
Storage works (proportion of operation and maintenance cost)	$804.97	$47.80	$852.77	$7,746.87	$1,810.67	$9,557.54
Canal system: Main canal	2,170.86	2,019.74	4,190.60	14,411.07	21,610.52	36,021.59
Lateral system:						
Main laterals	10,526.26	20,396.80	30,923.06	66,553.66	101,172.37	167,726.03
Sublaterals	.....	17,049.82	17,049.82	.....	17,049.82	17,049.82
	10,526.26	37,446.62	47,972.88	66,553.66	118,222.19	184,775.85
Undistributed expenses:						
Buildings	.....	1,166.81	1,166.81	.....	11,699.43	11,699.43
Highways	.....	73.20	73.20	.....	3,569.67	3,569.67
Telephone	[1] 142.10	[1] 4,268.71	[1] 4,410.81	.....	.....	.....
General expense	.....	[1] 5,723.42	[1] 5,723.42	.....	.....	.....
	[1] 142.10	[1] 8,752.12	[1] 8,894.22	.....	15,269.10	15,269.10
Plant accounts	.....	[1] 38.04	[1] 38.04	.....	8,417.75	8,417.75
Total	13,359.99	30,724.00	44,083.99	88,711.60	165,330.23	254,041.83

[1] Deduct.

REVENUES.

Item.	Fiscal year 1917.	To end of fiscal year 1917.
Operation and maintenance charges accrued on contracts with water-right applicants	$39,999.30	$205,516.95
Operation and maintenance charges paid in advance by water-right applicants	237.86	397.41
Operation and maintenance charges paid and forfeited by water-right applicants	.....	12.00
Penalties on operation and maintenance charges accrued on contracts with water-right applicants	663.27	680.34
Discounts allowed on operation and maintenance charges	[1] 1,184.20	[1] 2,225.12
Rentals of lands and handling during operation and maintenance period	690.14	5,412.52
Rentals of irrigation water	497.75	1,019.75
Accrued and unpaid water-right charges transferred and added to construction charge	5,837.47	34,788.44
Total	46,741.59	245,602.29
Difference (excess and deficit)	2,657.60	8,439.54

[1] Deduct.

Assets, liabilities, reserves, and capital, Shoshone project, to June 30,1917.

ASSETS.

Cash: In special deposit account		$951.67
Inventory of stock on hand:		
Stores issued and not used	$20,513.14	
Storehouse stock	32,247.46	
Cement and cement sacks	4,117.65	
Structural iron and steel	5,499.22	
Lumber	18,251.83	
Explosives	843.12	
Drain tile	21,237.23	
Fuel	965.22	
Goods in transit	11,032.68	
Products of local operations	21.03	
Freight and handling on inventory property	919.19	
Equipment adjustment inventory	2,400.00	
		118,047.77

Accounts receivable:			
Construction charges due and uncollected from water-right applicants		$3,903.92	
Construction charges unaccrued on contracts with water-right applicants		1,916,937.03	
Operation and maintenance charges due and uncollected from water-right applicants		5,849.33	
Uncollected operation and maintenance supplemental construction charges accrued		28.22	
Uncollected rentals of irrigation water		1,109.52	
Uncollected freight refunds		25.62	
Other uncollected items unclassified		19,637.71	
			$1,947,491.35
Construction work contracted:			
Unearned value of construction work contracted		75,509.46	
Estimated engineering expenses on construction work contracted		7,478.61	
			82,988.07
Construction work in process:			
Gross cost of construction of project to date	$4,408,170.52		
Gross supplemental construction cost of project to date	546,866.42		
Unadjusted clearing accounts	1,256.26		
Plant accounts	40,579.36		
		4,996,872.56	
Less revenues earned during construction, as follows:			
Rentals of buildings	13,712.56		
Rentals of grazing and farming lands	3,234.90		
Rentals of laborers' tents	2,071.98		
Rentals of telephones and tolls	192.22		
Contractors' freight refunds	19,355.59		
Forfeitures by defaulting bidders and contractors	43,759.07		
Other revenues, unclassified	1,714.96		
Less cost adjustments:			
Loss on mess-house operations	[1] 11,909.73		
Profit on mercantile-store operations	3,432.28		
Profit on hospital operations	819.70		
Loss on farming operations	[1] 4,217.07		
Total deductions		72,166.46	
Net cost of construction of project to date			4,924,706.10
Operation and maintenance deficit			87,801.03
Total assets			7,161,985.99

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:		
Unpaid progress earnings under construction contracts	$13,537.85	
Unpaid contract holdbacks	6,792.53	
Unpaid labor	19,831.33	
Unpaid purchases	13,185.76	
Unpaid freight and express charges	38,918.07	
Unpaid passenger fares	413.99	
Unpaid agreements to purchase real property	250.00	
		$92,929.53

[1] Deduct.

Contingent obligations:			
Unearned value of construction work contracted		$75,509.46	
Estimated engineering expenses on construction work contracted		7,478.61	
			$82,988.07
Guaranty and special deposits			951.67
Reserves for repayment to reclamation fund of cost of project:			
Value of construction contracts with water-right applicants		2,121,997.31	
Value of construction contracts with water-right applicants temporarily suspended		92,966.00	
Construction charges paid in advance by water-right applicants		4,998.81	
Construction charges paid and forfeited by water-right applicants		2,710.83	
Penalties paid on construction charges by water-right applicants		1,496.70	
			2,224,169.65
Receipts from sale of town lots			69,429.39
Capital investment:			
Disbursement vouchers	$5,205,943.58		
Transfer vouchers received from other projects	208,166.34		
		5,414,109.92	
Less:			
Collections	668,535.30		
Collection vouchers, repayment refund	1,444.54		
Transfer vouchers issued to other projects	52,612.40		
		722,592.24	
Net investment			4,691,517.68
Total liabilities, reserves, and capital investments of the Government			7,161,985.99

Operating expenses and revenues, Shoshone project, to June 30, 1917.

EXPENSES.

Feature.	Fiscal year 1917.			To end of fiscal year 1917.		
	Operation.	Maintenance.	Total.	Operation.	Maintenance.	Total.
Storage works: Shoshone Dam and Reservoir	$1,855.68	$1,024.99	$2,880.67	$13,891.66	$11,774.49	$25,666.15
Canal system: Garland Canal system	1,501.75	3,802.91	5,304.66	25,345.15	23,185.10	48,530.25
Lateral system: Garland distributing system	7,874.17	14,217.33	22,091.50	56,244.37	53,456.26	109,700.63
Drainage system: Garland open and closed drains	445.72	1,637.69	2,083.41	2,295.67	7,751.33	10,047.00
Undistributed expenses	.....	32.47	32.47	.....	7,628.81	7,628.81
Operation and maintenance plant, miscellaneous small structures	.....	862.80	862.80	.....	862.80	862.80
Total	11,677.32	21,578.19	33,255.51	97,776.85	104,658.79	202,435.64

Operating expenses and revenues, Shoshone project, to June 30, 1917—Continued.

REVENUES.

Item.	Fiscal year 1917.	To end of fiscal year 1917.
Operation and maintenance charges accrued on contracts with water-right applicants	$24,259.96	$157,364.50
Operation and maintenance charges paid in advance by water-right applicants	[1] 2,028.96	1,096.15
Operation and maintenance charges paid and forfeited by water-right applicants	62.75	1,640.91
Penalties on operation and maintenance charges accrued on contracts with water-right applicants	708.41	1,457.50
Discount allowed on operation and maintenance charges accrued on contracts with water-right applicants	[1] 759.33	[1] 1,356.87
Rentals of irrigation water	2,760.47	3,331.78
Accrued and unpaid operation and maintenance accruals transferred to and added to construction charges		147.75
Other revenues unclassified, earned during operating period	222.21	222.21
Total	25,216.51	163,903.93
Difference (deficit)	8,039.00	38,531.71

[1] Deduct.

Assets, liabilities, reserves, and capital, Washington office project, to June 30, 1917.

ASSETS.

Cash: In special deposit account		$16,315.06
Inventory of stock on hand:		
Stores issued and not used (obsolete printed matter)	$2,604.35	
Storehouse stock	40,199.84	
Products of local operations (unfinished drafting)	1,013.28	
Photographic materials	1,103.10	
		44,920.57
Accounts receivable:		
Uncollected items unclassified	9,453.73	
Uncollected travel, photographer	2,572.65	
Uncollected Bureau of National Parks	1,139.94	
		13,166.32
Cost:		
Undistributed cost to date	76.20	
Equipment	25,649.20	
Net cost of inventory to date		25,725.40
Total assets		100,127.35

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid labor		$1,362.17	
Unpaid purchases		6,113.31	
Unpaid freight and express charges		262.57	
Unpaid passenger fares		2,123.16	
Other unpaid items unclassified, miscellaneous		1,360.16	
			$11,221.37
Contingent obligations: Guaranty and special deposits			16,315.06
Capital investment:			
Disbursement vouchers	$3,470,301.18		
Transfer vouchers received from other projects	141,936.17		
		3,612,237.35	
Less—			
Collections	76,023.33		
Transfer vouchers issued to other projects	3,463,623.10		
		3,539,646.43	
Net investment			72,590.92
Total liabilities, reserves, and capital investments of the Government			100,127.35

Undistributed expense of Washington office to June 30, 1917.

Features:	
Examination and surveys	$76.20
Plant and equipment	25,649.20
Total	25,725.40

Estimated cost of Washington and detached offices during fiscal year 1918.

Salaries and wages	$176,000.00
Books, stationery, printing, office supplies	25,000.00
Furniture and fixtures, office	2,000.00
Rental of offices	9,200.00
Telephone service	550.00
Telegraph service (entire service)	6,400.00
Heat, light, and power	1,500.00
Traveling expenses	25,000.00
Books, stationery, printing, and drafting supplies for issue to field offices	31,000.00
Instruments, surveying, engineering, and mechanical for issue to field offices	9,500.00
Books, technical	1,500.00
Miscellaneous	1,000.00
Total	288,650.00

Assets, liabilities, reserves, and capital, Denver office, to June 30, 1917.

ASSETS.

Inventory of stock on hand: Storehouse stock		$3,497.31
Accounts receivable:		
Uncollected, Office of Indian Affairs	$5,737.05	
Uncollected, miscellaneous	44.20	
Unadjusted transfers to projects	27.42	
		5,808.67
Undistributed cost to date:		
Equipment	24,086.90	
Plus cost adjustment—		
Loss on hospital operations	777.81	
		24,864.71
Total assets		34,170.69

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid labor		$148.17	
Unpaid purchases		2,453.62	
Unpaid freight and express		214.08	
Unpaid passenger fares		2,976.07	
			$5,791.94
Capital investment:			
Disbursement vouchers	$286,147.16		
Transfer vouchers received from projects	38,133.05		
		324,280.21	
Less—			
Collections	18,402.26		
Transfer vouchers issued to projects	277,499.20		
		295,901.46	
Net investment			28,378.75
Total liabilities, reserves, and capital of the Government			34,170.69

Undistributed expense of the Denver office to June 30, 1917.

Features:	
Gross cost of inventory to June 30, 1917	$24,086.90
Plus—	
Loss on hospital operations	777.81
Net cost of inventory to June 30, 1917	24,864.71

Estimated cost of Denver office during fiscal year 1918.

Salaries and wages	$105,000.00
Books, stationery, printing, and office supplies	6,000.00
Furniture and fixtures, office	1,500.00
Rental of offices	5,000.00
Telephone service	600.00
Telegraph service	900.00
Traveling expense	15,000.00
Miscellaneous items	1,400.00
Total	135,400.00

Assets, liabilities, reserves, and capital, secondary projects, to June 30, 1917.

ASSETS.

Inventory of stock on hand:			
Storehouse stock		$445.23	
Equipment adjustment account		[1] 133.00	
			$312.23
Construction work in process:			
Gross cost of construction of projects to date	$1,065,943.42		
Plant accounts	5,780.50		
		1,071,723.92	
Less revenues earned during construction, as follows:			
Revenues, unclassified	1,446.01		
Less cost adjustments—			
Loss on mess-house operations	[1] 2,483.20		
Profit on hospital operations	335.90		
Plus		701.29	
Net cost of construction of project to date			1,072,425.21
Total assets			1,072,737.44

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid labor		$328.81	
Unpaid purchases		1,632.99	
Unpaid freight and express charges		269.20	
Unpaid passenger fares		325.45	
			$2,556.45
Capital investment:			
Disbursement vouchers	$1,004,109.34		
Transfer vouchers received from other projects	181,516.37		
		1,185,625.71	
Less—			
Collections	36,748.18		
Transfer vouchers issued to other projects	78,696.54		
		115,444.72	
Net investment			1,070,180.99
Total liabilities, reserves, and capital investments of the Government			1,072,737.44

[1] Deduct.

Assets, liabilities, reserves, and capital, Blackfeet (Indian) project, to June 30, 1917.

ASSETS.

Inventory of stock on hand:			
Stores issued and not used		$413.40	
Storehouse stock		620.37	
Cement		1,241.48	
Structural iron and steel		916.76	
Lumber		475.01	
Forage in stock		47.20	
Fuel		9.80	
Products of local operations		8.85	
Freight and handling on inventory property		[1] 626.51	
			$3,106.36
Accounts receivable:			
Uncollected freight refunds		10.66	
Other uncollected items unclassified		12.75	
Unadjusted transfers to other projects		178.33	
			201.74
Construction work in process:			
Gross cost of construction of project to date	$961,941.57		
Gross operation and maintenance cost during construction	34,091.42		
Plant accounts	6,351.94		
Unadjusted clearing accounts, loss	6.44		
		1,002,391.37	
Less revenues earned during construction, as follows:			
Rentals of buildings	891.25		
Rentals of telephones and tolls	739.65		
Contractors' freight refunds	36.04		
Other revenues, unclassified	7.50		
Less cost adjustments—			
Profit on mess-house operations	7,736.81		
Profit on mercantile-store operations	18,955.99		
Profit on hospital operations	662.28		
Total deductions		29,029.52	
Net cost of construction of project to date			973,361.85
Total assets			976,669.95

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid labor		$4,477.05	
Unpaid purchases		3,155.54	
Unpaid freight and express charges		176.90	
Unpaid passenger fares		3.85	
			$7,813.34
Charges accrued on contracts with Indian Service			928,217.43
Capital investment:			
Disbursement vouchers	$974,096.98		
Transfer vouchers received from other projects	109,379.18		
		1,083,476.16	
Less—			
Collections	958,396.49		
Transfers issued to other projects	84,440.49		
		1,042,836.98	
Net investment			40,639.18
Total liabilities, reserves, and capital investments of the Government			976,669.95

Assets, liabilities, reserves, and capital, Flathead (Indian) project, to June 30, 1917.

ASSETS.

Cash: Employees' hands, awaiting transfer to special fiscal agents			$170.11
Inventory of stock on hand:			
Stores issued and not used		$9,763.87	
Storehouse stock		53,500.49	
Cement		18,981.11	
Structural iron and steel		25,200.98	
Explosives		1,296.91	
Forage in stock		4,720.18	
Fuel		6,013.79	
Goods in transit		266.18	
Products of local operations		30,130.93	
Freight and handling on inventory property		598.07	
			150,472.51
Accounts receivable:			
Uncollected rentals of irrigation water		13,242.87	
Other uncollected items unclassified		2,167.24	
Unadjusted transfers to other projects		18.00	
			15,428.11
Construction work contracted: Unearned value of construction work contracted			71,277.53
Construction work in process:			
Gross cost of construction of project to date	$2,339,158.09		
Gross operation and maintenance cost during construction	127,850.62		
Unadjusted clearing accounts	[1] 5,580.20		
Plant accounts	106,943.81		
		2,568,372.32	
Less revenues earned during construction, as follows—			
Rentals of buildings	6,555.21		
Rentals of grazing and farming lands	1,242.75		
Rentals of irrigation water	35,856.74		
Rentals of telephones and tolls	5,637.28		
Contractors' freight refunds	2,604.90		
Forfeitures by defaulting bidders and contractors	1,830.00		
Other revenues, unclassified	803.45		
Less cost adjustments—			
Loss on mess-house operations	815.34		
Profit on mercantile-store operations	9,290.73		
Loss on hospital operations	2,755.60		
Total deductions		67,392.00	
Net cost of construction of project to date			2,500,980.32
Total assets			2,738,328.58

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:		
Unpaid progress earnings under construction contracts	$26,493.60	
Unpaid contract holdbacks	7,695.28	
Unpaid labor	34,377.43	
Unpaid purchases	40,339.97	
Unpaid freight and express charges	14,346.25	
Unpaid passenger fares	586.75	
Unredeemed coupon books	69.58	
		$123,908.86

[1] Deduct.

Contingent obligations: Unearned value of construction work contracted			$71,277.53
Reserves for repayment to reclamation fund of cost of project:			
Construction charges paid in advance by water-right applicants		$345.80	
Discounts on operation and maintenance charges		[1] 225.26	
Penalties paid on construction charges by water-right applicants		202.96	
Charges accrued on contracts with Indian Service		1,503,791.46	
			1,504,114.96
Capital investment:			
Disbursement vouchers	$2,594,375.59		
Joint construction vouchers received	353.10		
Transfer vouchers received from other projects	85,547.50		
		2,680,276.19	
Less—			
Collections	92,675.46		
Collection vouchers, repayment refunds	1,501,626.07		
Joint construction vouchers issued	353.10		
Transfer vouchers issued to other projects	46,594.33		
		1,641,248.96	
Net investment			1,039,027.23
Total liabilities, reserves, and capital investments of the Government			2,738,328.58

Assets, liabilities, reserves, and capital, Fort Peck (Indian) project, to June 30, 1917.

ASSETS.

Cash: In special fiscal agent's possession, awaiting remittance			$6.40
Inventory of stock on hand:			
Stores issued and not used (mercantile store)		$5,697.70	
Storehouse stock		3,630.99	
Cement		6,404.17	
Structural iron and steel		3,605.38	
Lumber		287.10	
Forage in stock		2,063.74	
Fuel		713.80	
Products of local operations		308.69	
Freight and handling on inventory property		[1] 311.87	
			22,399.70
Accounts receivable: Uncollected items unclassified			56.73
Construction work in process:			
Gross cost of construction of project to date	$523,234.22		
Gross operation and maintenance cost during construction	23,267.23		
Plant accounts	13,120.01		
		559,621.46	
Less revenues earned during construction, as follows—			
Of buildings	383.51		
Other revenues, unclassified	1,059.55		

[1] Deduct.

Construction work in process—Contd.			
Less cost adjustments—			
Loss on mess-house operations	[1] $951.24		
Profit on mercantile store operations	9,537.94		
Profit on hospital operations	570.24		
Loss farming operations	[1] 469.40		
Total deductions		$10,130.60	
Net cost of construction of project to date			$549,490.86
Total assets			571,953.69

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid progress earnings under construction contracts		1,650.89	
Unpaid contract holdbacks		1,550.00	
Unpaid labor		2,488.42	
Unpaid purchases		4,837.55	
Unpaid freight and express charges		1,534.20	
Unpaid passenger fares		158.00	
Unredeemed coupon books		94.81	
Other unpaid items unclassified		980.76	
			13,294.63
Reserves for repayment to reclamation fund of cost of project: Charges accrued on contracts with Indian Service			458,735.27
Capital investment:			
Disbursement vouchers	$541,451.91		
Transfer vouchers received from other projects	40,897.01		
		582,348.92	
Less—			
Collections	7,501.26		
Collection vouchers, repayment refunds	458,735.27		
Transfer vouchers issued to other projects	16,188.60		
		482,425.13	
Net investment			99,923.79
Total liabilities, reserves, and capital investments of the Government			571,953.69

[1] Deduct.

RECEIPTS, ALLOTMENTS, AND INVESTMENTS, BY STATES.

The table following gives a statement of additions to the reclamation fund from the sale of public lands, by States, and also shows the amounts allotted and the net investment of the Government for irrigation work in each of the reclamation States.

TABLE 1.—*Reclamation fund accretions from the sale of public lands, allotments, and net investments, by States.*

States.	Actual receipts from sales of public land, exclusive of town-site sales, transferred to credit of reclamation fund.		Estimated receipts with Treasurer United States on June 30, 1917, not yet audited.	Total estimated receipts from sales of public land, exclusive of town-site sales, to June 30, 1917.
	Fiscal year 1917.	Total to June 30, 1917.		
Arizona	$79,728.35	$1,451,879.57	$35,000.00	$1,486,879.57
California	249,959.09	6,203,791.00	125,000.00	6,328,791.00
Colorado	431,742.21	7,993,369.27	200,000.00	8,193,369.27
Idaho	226,668.40	5,784,463.79	120,000.00	5,904,463.79
Kansas	14,586.76	1,010,844.42	5,000.00	1,015,844.42
Montana	923,685.69	11,809,488.32	325,000.00	12,134,488.32
Nebraska	37,374.72	1,882,644.87	20,000.00	1,902,644.87
Nevada	32,158.30	670,625.55	15,000.00	685,625.55
New Mexico	205,723.01	4,619,045.89	100,000.00	4,719,045.89
North Dakota	46,788.14	12,136,782.19	20,000.00	12,156,782.19
Oklahoma	13,951.96	5,853,321.02	5,000.00	5,858,321.02
Oregon	139,905.16	10,911,232.64	65,000.00	10,976,232.64
South Dakota	147,511.04	7,333,710.99	70,000.00	7,403,710.99
Utah	64,152.94	2,140,709.87	30,000.00	2,170,709.87
Washington	73,982.35	6,975,939.72	35,000.00	7,010,939.72
Wyoming	237,733.02	5,112,233.74	130,000.00	5,242,233.74
Total	2,925,651.14	91,890,082.85	1,300,000.00	93,190,082.85

States.	Allotments.		Net investment.	
	Fiscal year 1917.	Total to June 30, 1917.	Fiscal year 1917.	Total to June 30, 1917.
Arizona	$1,352,800.00	$22,780,928.31	$389,337.32	$17,782,704.60
California	204,095.00	3,613,634.98	103,545.98	3,082,765.86
Colorado	637,400.00	10,149,075.75	482,184.50	9,336,928.01
Idaho	820,900.00	19,770,171.92	145,846.32	16,718,086.15
Kansas	1,600.00	397,300.00	[1] 286.68	375,954.11
Montana	953,400.00	13,948,074.55	735,341.30	12,052,976.31
Nebraska	996,460.00	6,855,387.01	565,450.09	5,363,343.58
Nevada	210,000.00	6,698,653.63	38,445.29	5,825,273.73
New Mexico	723,950.00	6,736,582.03	361,358.62	5,042,905.29
North Dakota	38,800.00	2,368,167.44	2,345.17	1,976,230.35
Oklahoma	51,250.00	131,740.44	3,594.05	82,983.89
Oregon	346,425.00	5,364,179.78	252,522.66	4,355,372.59
South Dakota	123,150.00	3,980,018.04	42,244.37	3,426,643.13
Utah	313,700.00	3,704,018.37	212,377.63	3,308,007.56
Washington	1,275,400.00	12,084,680.25	719,770.09	8,774,303.59
Wyoming	1,038,340.00	8,615,307.38	636,601.16	7,003,934.07
Texas	291,800.00	3,146,300.00	132,987.52	2,342,074.47
General accounts	37,000.00	7,922,980.12	[1] 14,018.69	110,615.48
Total	9,419,470.00	138,267,200.00	4,809,646.70	106,961,102.77

[1] Deduct.

ALLOTMENTS AND NET INVESTMENT, BY PROJECTS AND BY STATES.

This statement shows the amount of money allotted to each project, the amount of money expended on each project to June 30, 1917, and the amount of money allotted to States and expended in the respective States for the same period:

TABLE 2.—*Statement of project allotments and net investments, by States, to June 30, 1917*

State and project.	Allotments.		Net investment.	
	Fiscal year 1917.	To June 30, 1917.	Fiscal year 1917.	To June 30, 1917.
Arizona:				
Salt River	$849,820.00	$14,546,500.00	$48,916.78	$10,499,026.01
Yuma	476,835.00	8,001,449.00	315,228.37	7,070,805.81
Colorado River		36,279.30		36,279.30
Colorado River Basin	26,145.00	116,810.05	24,503.48	99,514.83
Little Colorado		9,554.33		9,554.33
San Carlos		24,829.51		24,829.51
San Pedro		2,427.34		2,427.34
Arizona cooperative		3,500.00	688.69	688.69
Preliminary investigations		39,578.78		39,578.78
Total	1,352,800.00	22,780,928.31	389,337.32	17,782,704.60
California:				
Yuma	97,665.00	1,638,851.00	64,564.85	1,448,237.33
Orland	50,100.00	1,039,600.00	6,036.60	875,513.14
Klamath	45,475.00	800,800.00	23,984.31	643,739.16
Colorado River		7,430.70		7,430.70
Colorado River Basin	5,355.00	23,924.95	5,018.78	20,382.55
Iron Canyon		19,185.96		9,779.45
Pitt River		2,530.25	10.00	2,499.18
Shasta County		3,346.65	3.76	2,144.75
Lassen County		5,299.15		1,945.60
Owens Valley		12,061.92		12,061.92
Sacramento Valley		43,620.72		43,620.72
San Joaquin		3,531.20		3,531.20
Imperial Valley	4,000.00	4,000.00	2,769.98	2,769.98
Kings River storage	1,500.00	1,500.00	1,157.70	1,157.70
Preliminary investigations		7,952.48		7,952.48
Total	204,095.00	3,613,634.98	103,545.98	3,082,765.86
Colorado:				
Grand Valley	260,000.00	3,141,300.00	288,452.65	3,081,350.33
Uncompahgre	377,400.00	6,999,700.00	193,731.85	6,247,501.93
White River		4,357.00		4,357.00
Preliminary investigations		3,718.75		3,718.75
Total	637,400.00	10,149,075.75	482,184.50	9,336,928.01
Idaho:				
Boise	600,000.00	13,074,200.00	230,868.08	11,747,712.97
Minidoka	213,600.00	6,664,400.00	[1] 89,307.27	4,945,033.53
Dubois		17,228.91	23.15	17,252.06
Port Neuf		2,168.01		2,168.01
General investigations		4,000.00		1,191.78
King Hill	6,500.00	7,375.00	3,717.48	4,182.92
Swan Valley	800.00	800.00	544.88	544.88
Total	820,900.00	19,770,171.92	145,846.32	16,718,086.15
Kansas: Garden City	1,600.00	397,300.00	[1] 286.68	375,954.11
Montana:				
Huntley	176,000.00	2,092,600.00	100,517.53	1,373,083.25
Milk River	307,000.00	3,188,700.00	250,875.08	2,915,154.63
Milk River, St. Mary storage	312,300.00	2,564,400.00	182,052.62	2,281,146.44
Sun River	132,900.00	3,622,600.00	183,112.95	3,154,568.42
Lower Yellowstone	25,200.00	2,423,890.00	18,823.12	2,270,199.43
Clark Fork		5,581.23		5,581.23
Crow Reservation		18,911.96		18,911.96
Lake Basin		7,103.26		7,103.26
Madison River		10,729.09		10,729.09
Marias		13,559.01	[1] 40.00	13,498.60
Total	953,400.00	13,948,074.55	735,341.30	12,052,976.31

TABLE 2.—*Statement of project allotments and net investments, by States, to June 30, 1917*—Continued.

State and project.	Allotments.		Net investment.	
	Fiscal year 1917.	To June 30, 1917.	Fiscal year 1917.	To June 30, 1917.
Nebraska:				
North Platte	$995,960.00	$6,842,010.00	$565,450.09	$5,357,084.87
Investigations	500.00	10,500.00		3,381.70
South Platte		2,877.01		2,877.01
Total	996,460.00	6,855,387.01	565,450.09	5,363,343.58
Nevada:				
Truckee-Carson	210,000.00	6,682,100.00	38,445.29	5,811,577.36
Walker River		12,503.63		12,503.63
Walker River investigations		4,050.00		1,192.74
Total	210,000.00	6,698,653.63	38,445.29	5,825,273.73
New Mexico:				
Carlsbad	279,000.00	1,569,100.00	159,647.16	1,115,064.30
Hondo	2,750.00	408,100.00	2,230.19	372,120.45
Rio Grande	442,200.00	4,706,100.00	199,481.27	3,502,438.51
La Plata		28,064.33		28,064.33
Las Vegas		5,014.09		5,014.09
Urton Lake		17,464.70		17,464.70
Preliminary investigations		2,738.91		2,738.91
Total	723,950.00	6,736,582.03	361,358.62	5,042,905.29
North Dakota:				
North Dakota pumping	28,000.00	1,267,600.00	[1] 5,433.98	942,106.10
Lower Yellowstone	10,800.00	1,038,810.00	8,067.05	972,942.61
Bismarck		13,621.69		13,621.69
Little Missouri		11,933.52		11,933.52
Nesson		17,471.83		17,471.83
Washburn		10,532.73		10,532.73
Bowman		3,236.64	[1] 287.90	2,660.84
Preliminary investigations		4,961.03		4,961.03
Total	38,800.00	2,368,167.44	2,345.17	1,976,230.35
Oklahoma:				
Lawton	51,000.00	62,000.00	3,456.75	13,346.15
Cimarron		8,891.17		8,891.17
Red River		60,209.27		60,209.27
Investigations		400.00		400.00
Turkey Creek	250.00	250.00	137.30	137.30
Total	51,250.00	131,750.44	3,594.05	82,983.89
Oregon:				
Umatilla	210,000.00	2,756,200.00	179,305.84	2,232,357.14
Klamath	136,425.00	2,402,400.00	71,952.92	1,931,217.46
Central Oregon		40,346.41		40,346.41
Columbia River		20,037.47	526.50	17,008.51
Malheur		83,490.62		83,490.62
Oregon cooperative		60,761.49	737.40	50,008.66
Preliminary investigations		943.79		943.79
Total	346,425.00	5,364,179.78	252,522.66	4,355,372.59
South Dakota:				
Belle Fourche	123,150.00	3,963,200.00	42,244.37	3,409,825.09
Preliminary investigations		16,818.04		16,818.04
Total	123,150.00	3,980,018.04	42,244.37	3,426,643.13
Texas:				
Rio Grande	294,800.00	3,137,400.00	132,987.52	2,334,959.00
Pecos River		8,900.00		7,115.47
Total	294,800.00	3,146,300.00	132,987.52	2,342,074.47
Utah:				
Strawberry Valley	313,700.00	3,651,000.00	212,377.63	3,254,989.19
Bear Lake		18,827.72		18,827.72
Utah Lake		34,049.30		34,049.30
Provo-Weber		141.35		141.35
Total	313,700.00	3,704,018.37	212,377.63	3,308,007.56

TABLE 2.—*Statement of project allotments and net investments, by States, to June 30, 1917*—Continued.

State and project.	Allotments.		Net investment.	
	Fiscal year 1917.	To June 30, 1917.	Fiscal year 1917.	To June 30, 1917.
Washington:				
Okanogan	$49,000.00	$981,800.00	$23,953.95	$782,273.11
Yakima-Storage	1,226,400.00	10,936,600.00	558,616.86	2,501,270.30
Yakima-Sunnyside			163,193.60	2,454,418.01
Yakima-Tieton			[1] 26,097.92	2,872,878.96
Benton		11,105.05	[1] 31.20	11,042.65
Kittitas		19,366.90		19,366.90
Wapato		36,465.77		36,465.77
Palouse		76,393.01		76,393.01
Palouse cooperative		12,956.56	134.80	10,201.92
Priest Rapids		6,216.01		6,216.01
Preliminary investigations		3,776.95		3,776.95
Total	1,275,400.00	12,084,680.25	719,770.09	8,774,303.59
Wyoming:				
North Platte	426,840.00	2,932,290.00	242,335.75	2,295,893.52
Shoshone	606,700.00	5,666,800.00	390,560.54	4,691,517.68
De Smet		8,917.38		8,917.38
Wyoming cooperative	1,500.00	4,000.00	1,337.35	3,683.01
Pathfinder pumping				1,554.96
Wind River	3,300.00	3,300.00	2,367.52	2,367.52
Total	1,038,340.00	8,615,307.38	636,601.16	7,003,934.07
General accounts	37,000.00	7,922,980.12	[1] 14,018.69	110,615.48
Grand total	9,419,470.00	138,267,210.00	4,809,646.70	106,961,102.77

[1] Deduct.

RECEIPTS FROM SALES OF PUBLIC LANDS.

During the fiscal year 1916 the General Land Office collected from the sales of public lands, not including town-site sales, a total of $3,186,239.81, which resulted in the addition to the fund of $2,648,057.74. The amount added to the fund was 83.109 per cent of the amount collected. During the fiscal year 1917 the gross receipts were approximately $3,211,094. Of this amount, $1,611,755.81 has been credited to the reclamation fund, and it is estimated that there is a balance of $1,300,000, which will be available before the end of the calendar year.

The following table shows the gross receipts from the sale of public lands and the corresponding accruals to the reclamation fund by fiscal years since the passage of the reclamation law:

TABLE 3.—*Total receipts from the sale of public lands and resulting accruals to the reclamation fund.*

Fiscal year.	Total receipts from sale of public lands in reclamation States (not including town-site sales).	Accruals to the reclamation fund.		Total receipts from sale of town sites in reclamation States.
		Amount (not including town-site sales).	Per cent of total receipts.	
1901	$3,618,546.38	$3,144,821.91	86.908	
1902	5,115,619.61	4,585,520.53	89.637	
1903	9,395,741.68	8,713,996.60	92.744	
1904	7,605,978.29	6,826,253.59	89.748	
1905	5,328,084.07	4,805,515.39	90.192	
1906	5,732,554.35	5,166,336.50	90.122	
1907	8,471,757.75	7,914,131.71	93.417	$61,535.00
1908	10,235,294.28	9,430,573.98	92,137	12,864.06
1909	8,391,938.83	7,755,466.81	92,415	10,017.85
1910	7,679,421.61	7,028,185.73	91,521	60.112.86
1911	6,631,000.12	6,135,547.76	92,528	69.468.80
1912	6,324,012.34	5,657,498.88	89.460	15,224.10
1913	4,202,946.67	3,737,910.55	88.935	17,784.74
1914	4,058,991.61	3,460,451.63	85.229	15,280.25
1915	3,719,754.90	3,268,057.73	87.856	18,436.28
1916	3,186,239.81	2,648,057.74	83.109	21,189.28
1917	3,211,094.00	[1] 2,911,755.81	90.677	31,250.15
Total	102,908,976.30	93,190,082.85	90.556	333,163.37

[1] Actual accruals to Dec. 31, 1916, $1,611,755.81; balance estimated.

ALLOTMENTS BY PROJECTS.

When funds become available, annual allotments are made in pursuance of which work is carried on. Table No. 4 gives a statement of the allotments from 1902 to June 30, 1917:

TABLE 4.—*Allotments for primary and secondary projects and general expenses to June 30, 1917.*

State and project.	Fiscal years 1902–1916.	Additional allotments during fiscal year 1917.	Total allotments to June 30, 1917.	Analysis of allotments.	
				Reclamation fund.	Bond loan.
Arizona: Salt River	$14,042,000.00	$849,820.00	$14,546,500.00	$14,051,500.00	$495,000.00
Arizona-California: Yuma	9,363,815.00	574,500.00	9,640,300.00	8,440,300.00	1,200,000.00
California: Orland	1,026,345.00	50,100.00	1,039,600.00	1,039,600.00	.....
Colorado:					
Grand Valley	3,226,584.06	260,000.00	3,141,300.00	2,141,300.00	1,000,000.00
Uncompahgre	6,737,000.00	377,400.00	6,999,700.00	5,499,700.00	1,500,000.00
Idaho:					
Boise	13,445,643.36	600,000.00	13,074,200.00	11,074,200.00	2,000,000.00
Minidoka	6,980,663.53	213,600.00	6,664,400.00	6,664,400.00	.....
Kansas: Garden City	397,592.77	1,600.00	397,300.00	397,300.00	.....
Montana:					
Huntley	1,941,000.00	176,000.00	2,092,600.00	2,092,600.00	.....
Milk River	.....	307,000.00	3,188,700.00	2,188,700.00	1,000,000.00
Milk River, St. Mary storage	5,465,392.29	312,300.00	2,564,400.00	2,564,400.00	.....
Sun River	3,471,000.44	132,900.00	3,622,600.00	3,622,600.00	.....
Montana-North Dakota: Lower Yellowstone	3,475,703.81	36,000.00	3,462,700.00	3,462,700.00	.....
Nebraska-Wyoming: North Platte	8,448,284.09	1,422,800.00	9,774,300.00	7,774,300.00	2,000,000.00
Nevada: Truckee-Carson	6,660,069.11	210,000.00	6,682,100.00	5,489,100.00	1,193,000.00
New Mexico:					
Carlsbad	1,281,379.66	279,000.00	1,569,100.00	1,569,100.00	.....
Hondo	405,038.77	2,750.00	408,100.00	408,100.00	.....
New Mexico-Texas:					
Rio Grande	6,738,957.98	737,000.00	7,843,500.00	3,343,500.00	4,500,000.00
Rio Grande, Elephant Butte storage					
North Dakota: North Dakota pumping	1,249,034.99	28,000.00	1,267,600.00	1,267,600.00	.....
Oklahoma: Lawton	97,022.28	51,000.00	62,000.00	62,000.00	.....
Oregon: Umatilla	2,598,751.94	210,000.00	2,756,200.00	2,431,200.00	325,000.00
Oregon-California: Klamath	3,099,992.11	181,900.00	3,203,200.00	2,603,200.00	600,000.00
South Dakota: Belle Fourche	3,856,722.96	123,150.00	3,963,200.00	3,963,200.00	.....
Utah: Strawberry Valley	3,620,300.00	313,700.00	3,651,000.00	1,379,000.00	2,272,000.00
Washington:					
Okanogan	956,000.00	49,000.00	981,800.00	981,800.00	.....
Yakima-Storage					
Yakima-Sunnyside	10,464,535.89	1,226,400.00	10,936,600.00	9,021,600.00	1,915,000.00
Yakima-Tieton					
Wyoming: Shoshone	5,206,299.69	606,700.00	5,666,800.00	5,666,800.00	.....
Secondary projects	1,170,917.68	49,850.00	1,111,400.00	1,111,400.00	.....
Preliminary investigations	80,488.73	.....	80,488.73	80,488.73	.....
General accounts	7,176,548.42	37,000.00	7,875,521.27	7,875,511.27	.....
Total	132,683,084.56	9,419,470.00	138,267,210.00	118,267,200.00	20,000,000.00

NOTE.—Differences in above allotments due to amounts lapsed at end of fiscal years.

RECONCILING ADMINISTRATIVE ACCOUNTS WITH TREASURY DEPARTMENT BALANCES AND STATEMENTS.

The accounts of the Treasury Department are limited to the movement of cash, either by withdrawal or deposit to the appropriations involved. The administrative accounts of the Reclamation Service, as entered in the tables herein, show the amount, both for receipts and disbursements, upon an accrual basis. The cash account, however, must, if correct, agree with the Treasury Department statement of funds made available by appropriations, reimbursements, expenditures, and withdrawals. Table 5, below, shows a condensed statement of cash collected, appropriated, disbursed, and on hand, and Table 6 gives a reconciliation of the amounts of the appropriations, withdrawals, and balances used in the preparation of these financial tables, with the figures shown by the statements of the Treasury Department.

TABLE 5.—*Reclamation fund account to June 30, 1917.*

Item.		Debit.	Credit.
Balance end of fiscal year, as per fifteenth annual report, p. 760			$89,266,344.83
Receipts durng fiscal year 1917:			
Appropriation warrant—			
No. 15, Aug. 5, 1916	$61,536.90		
No. 17, Aug. 23, 1916	450,370.93		
No. 27, Sept. 30, 1916	7,050.86		
No. 30, Oct. 24, 1916	180,725.87		
No. 39, Dec. 7, 1916	361,103.83		
No. 42, Dec. 30, 1916	9,240.60		
No. 45, Jan. 9, 1917	260,157.90		
No. 53, Mar. 1, 1917	729,471.58		
No. 56, Mar. 31, 1917	6,871.56		
No. 64, May 5, 1917	882,284.23		
June 30, 1917	8,087.13		
			2,956,901.39
Special reclamation fund, reimbursable, act of June 25, 1910 (36 Stat., 835)—			
Balance end of fiscal year 1916, as per fifteenth annual report, Table No. 5			15,500,000.00
No. 32, Oct. 27, 1916	$500,000.00		
No. 36, Nov. 23, 1916	500,000.00		
No. 48, Feb. 7, 1917	500,000.00		
			1,500,000.00
Total			109,223,246.22
Disbursements, 29,074 vouchers, as per Table 7		$127,924,770.65	
Collections, 46,094 vouchers, as per Table 8			20,963,667.88
Balance with Treasurer, United States, as per Table 6		1,130,212.33	
Balance with special fiscal agents		798,767.75	
Town-site appropriations credited to projects		333,163.37	
Total		130,186,914.10	130,186,914.10

TABLE 6.—*Balances of reclamation fund with the Treasurer of the United States, June 30, 1917.*

Item.	Appropriation.	Withdrawals.	Balances.
Total and balance end of fiscal year 1916, as per fifteenth annual report, p. 760, Table 5	$104,766,344.83	$103,047,253.34	$1,719,091.49
Reclamation fund	2,956,901.39	4,993,732.25	[1] 536,830.86
Special reclamation fund, reimbursable, act of June 25, 1910 (36 Stat., 835)	1,500,000.00		
Total and balance as per statement of the Treasury Department	109,223,246.22	108,040,985.59	1,182,260.63
For items in Reclamation Service accounts, but not included in above add withdrawals on direct settlements by auditor $52,458.69			
Deduct repayments on direct settlements 410.39		52,048.30	52,048.30
Total	109,223,246.22	108,093,033.89	1,130,212.33

TABLE 7.—*Disbursement vouchers paid to June 30, 1917.*

Fiscal year.	Quarter ended—	Number of vouchers.	Amount.
Balance from fifteenth annual report		379,907	$119,901,640.72
1917	Sept. 30, 1916	7,298	2,000,201.72
	Dec. 31, 1916	7,411	2,161,815.70
	Mar. 31, 1917	6,529	1,691,455.77
	June 30, 1917	7,844	2,169,656.74
Total to June 30, 1917		408,989	127,924,770.65

TABLE 8.—*Collection vouchers paid to June 30, 1917.*

Fiscal year.	Quarter ended—	Number of vouchers.	Amount.
Balance from fifteenth annual report		122,371	$17,750,184.65
1917	Sept. 30, 1916	6,338	629,311.96
	Dec. 31, 1916	11,705	665,773.19
	Mar. 31, 1917	15,705	1,051,013.01
	June 30, 1917	12,346	867,385.07
Total to June 30, 1917		168,465	20,963,667.88

TABLE 9.—*Transfer vouchers approved to June 30, 1917.*

Fiscal year.	Quarter ended—	Number of vouchers.	Amount.
Balance from fifteenth annual report		9,567	$5,552,221.95
1917	Sept. 30, 1916	279	76,526.79
	Dec. 31, 1916	246	105,472.22
	Mar. 31, 1917	359	174,032.33
	June 30, 1917	415	176,441.87
Total to June 30, 1917		10,866	6,084,695.16

[1] Deduct.

INVESTMENT OF THE UNITED STATES IN PROJECTS.

Below is given a statement showing cash disbursed and received on account of the several projects and transfers between projects. The work of the service is grouped under four general heads, as follows: Primary projects, those for which specific appropriations of funds are in effect and on which construction is under way; secondary projects, those for which general appropriations of funds have been made for all such work as a whole and on which only preliminary studies and surveys have been made to determine their advisability and practicability; Indian irrigation projects; and general accounts, which represent those expenditures that are general in nature and are not directly chargeable to any project when first incurred, but which become a charge against all projects as a part of the general or overhead expenses of the service.

Table 10 gives the voucher transactions and net investments of the United States on the several primary projects to June 30, 1917; Table 11 gives the voucher transactions on secondary projects; and Table 12 gives the voucher transactions and net investment of the United States on Indian irrigation projects and miscellaneous to June 30, 1917.

TABLE 10.—*Voucher transactions and net investment of the United States on primary projects to June 30, 1917.*

State and project.	Debits.			
	Disbursement vouchers.		Transfers received.	
	Fiscal year 1917.	To June 30, 1917.	Fiscal year 1917.	To June 30, 1917.
Arizona: Salt River	$753,539.92	$14,012,725.37	$48,764.39	$474,871.32
Arizona-California: Yuma	451,399.46	9,180,085.43	26,879.47	284,496.92
California: Orland	44,184.51	980,584.26	3,690.32	52,482.96
Colorado:				
Grand Valley	297,194.85	2,981,447.77	17,965.65	144,986.63
Uncompahgre	277,198.74	6,701,634.40	18,916.72	178,109.05
Idaho:				
Boise	504,636.44	12,448,774.76	31,260.44	463,666.50
Minidoka	175,658.15	6,280,633.28	24,401.70	333,235.32
Kansas: Garden City	44.45	380,110.76	449.52	12,294.10
Montana:				
Huntley	129,393.77	1,937,929.85	9,636.43	96,883.71
Milk River	247,528.50	2,845,104.11	13,303.97	153,297.31
St. Mary	178,546.50	2,175,482.39	10,161.68	221,497.46
Sun River	205,105.64	3,291,273.98	11,525.70	174,661.24
Montana-North Dakota: Lower Yellowstone	45,163.99	3,339,586.81	3,552.69	106,830.90
Nebraska-Wyoming: North Platte	1,041,833.14	8,493,692.71	57,718.47	272,680.47
Nevada: Truckee-Carson	111,309.84	6,276,322.85	13,561.61	299,183.42
New Mexico:				
Carlsbad	191,817.02	1,423,488.75	18,509.84	62,402.18
Hondo	2,455.54	392,784.15	678.15	14,954.73
New Mexico-Texas: Rio Grande	502,328.89	6,211,629.04	32,288.23	359,553.10
North Dakota: North Dakota Pumping	24,386.20	1,063,980.82	1,980.27	199,861.98
Oklahoma: Lawton	2,936.71	11,512.28	795.54	2,433.07
Oregon: Umatilla	214,394.57	2,647,158.90	11,371.45	89,840.67
Oregon-California: Klamath	135,047.34	3,049,164.53	10,323.67	96,177.56
South Dakota: Belle Fourche	128,676.33	3,828,227.61	8,378.63	106,316.24
Utah: Strawberry Valley	286,199.27	3,477,091.39	14,619.41	134,535.63
Washington:				
Okanogan	36,376.81	916,592.63	2,762.51	40,683.82
Yakima-Storage	657,941.61	2,711,186.97	55,235.01	256,806.87
Yakima-Sunnyside	285,026.11	3,943,087.31	31,796.90	72,549.49
Yakima-Tieton	66,336.64	3,326,405.88	5,692.53	170,392.64
Wyoming: Shoshone	450,342.61	5,205,943.58	25,847.46	208,166.34
Total	7,447,003.55	119,533,642.57	512,068.36	5,383,851.63

TABLE 10.—*Voucher transactions and net investment of the United States on primary projects to June 30, 1917*—Continued.

State and project.	Credits.					
	Collection vouchers.					
	Water right charges.				Miscellaneous.	
	Construction.		Operation and maintenance.			
	Fiscal year 1917.	To June 30, 1917.	Fiscal year 1917.	To June 30, 1917.	Fiscal year 1917.	To June 30, 1917.
Arizona: Salt River		$100,000.00			$751,159.88	$3,821,851.03
Arizona-California: Yuma	$5,827.66	276,612.92	$18,124.07	$79,214.40	73,818.69	494,334.57
California: Orland	17,787.66	17,787.66			23,938.79	134,511.27
Colorado:						
Grand Valley					19,230.54	33,565.57
Uncompahgre					100,543.38	597,122.98
Idaho:						
Boise					288,445.98	1,025,470.72
Minidoka	[1] 59,629.53	501,412.21	73,775.49	384,185.11	151,071.59	554,814.13
Kansas: Garden City		142.50		104.50	36.80	4,597.47
Montana:						
Huntley	10,641.56	280,814.58	20,713.55	136,227.25	7,085.56	84,130.03
Milk River					8,759.87	46,400.50
St. Mary					6,603.21	57,716.47
Sun River	13,271.12	115,956.48	7,297.53	49,704.97	9,472.69	73,156.97
Montana-North Dakota: Lower Yellowstone	34.07	35,906.27	7.84	36,801.81	21,750.00	89,223.11
Nebraska-Wyoming: North Platte	154,038.70	506,638.57	103,443.06	434,419.09	33,984.39	144,326.58
Nevada: Truckee-Carson	18,057.08	314,824.34	42,420.32	234,365.25	24,895.41	163,638.01
New Mexico:						
Carlsbad	19,935.94	160,304.83	21,938.89	161,755.38	8,529.36	34,779.95
Hondo					779.51	34,617.67
New Mexico-Texas: Rio Grande					189,057.89	609,967.73
North Dakota: North Dakota Pumping	1,037.77	9,095.82		13,307.15	30,542.06	115,925.57
Oklahoma: Lawton						.20
Oregon: Umatilla	19,029.71	225,367.94	16,135.19	91,337.24	10,442.78	92,701.26
Oregon-California: Klamath	16,089.85	307,172.71	26,155.92	163,283.88	6,933.01	68,054.17
South Dakota: Belle Fourche	43,439.76	211,518.44	42,530.83	173,979.78	8,789.79	101,231.98
Utah: Strawberry Valley	28,531.45	48,359.32	13,947.34	19,076.57	42,182.10	234,978.45
Washington:						
Okanogan	59.64	24,682.19	798.55	37,093.44	13,706.68	102,202.30
Yakima-Storage	100,690.00	300,690.00	150.00	150.00	43,827.09	120,642.72
Yakima-Sunnyside	52,493.73	731,916.52	78,551.78	621,226.19	10,532.04	118,567.56
Yakima-Tieton	54,407.83	323,796.44	35,146.62	185,027.06	5,847.88	83,986.41
Wyoming: Shoshone	35,091.50	303,725.17	24,461.73	152,384.73	25,155.82	213,869.94
Total	650,094.56	4,796,724.91	525,548.71	2,973,643.80	1,917,122.79	9,256,442.32

TABLE 10.—*Voucher transactions and net investments of the United States on primary projects to June 30, 1917*—Continued.

State and project.	Credits. Transfers issued.		Net investment of the United States.	
	Fiscal year 1917.	To June 30, 1917.	Fiscal year 1917.	To June 30, 1917.
Arizona: Salt River	$2,227.65	$66,719.65	$48,916.78	$10,499,026.01
Arizona-California: Yuma	715.29	95,377.32	379,793.22	8,519,043.14
California: Orland	111.78	5,255.15	6,036.60	875,513.14
Colorado:				
Grand Valley	7,477.31	11,518.50	288,452.65	3,081,350.33
Uncompahgre	1,840.23	35,118.54	193,731.85	6,247,501.93
Idaho:				
Boise	16,582.82	139,257.57	230,868.08	11,747,712.97
Minidoka	4,940.51	228,423.62	[1] 89,307.27	4,945,033.53
Kansas: Garden City	743.85	11,606.28	[1] 286.68	375,954.11
Montana:				
Huntley	72.00	160,558.45	100,517.53	1,373,083.25
Milk River	1,197.52	36,846.29	250,875.08	2,915,154.63
St. Mary	52.35	55,116.94	182,052.62	2,284,146.44
Sun River	3,477.05	72,548.38	183,112.95	3,154,568.42
Montana-North Dakota: Lower Yellowstone	34.60	41,344.48	26,890.17	3,243,142.04
Nebraska-Wyoming: North Platte	299.62	28,010.55	807,785.84	7,652,978.39
Nevada: Truckee-Carson	1,053.35	51,101.31	38,445.29	5,811,577.36
New Mexico:				
Carlsbad	275.51	13,986.47	159,647.16	1,115,064.30
Hondo	123.99	1,000.76	2,230.19	372,120.45
New Mexico-Texas: Rio Grande	13,090.44	123,816.90	332,468.79	5,837,397.51
North Dakota: North Dakota Pumping	220.62	183,408.16	[1] 5,433.98	942,106.10
Oklahoma: Lawton	275.50	599.00	3,456.75	13,346.15
Oregon: Umatilla	852.50	95,235.99	179,305.84	2,232,357.14
Oregon-California: Klamath	255.00	31,874.71	95,937.23	2,574,956.62
South Dakota: Belle Fourche	50.21	37,988.56	42,244.37	3,409,825.09
Utah: Strawberry Valley	3,780.16	54,223.49	212,377.63	3,254,989.19
Washington:				
Okanogan	620.50	11,025.41	23,953.95	782,273.11
Yakima-Storage	9,892.67	45,240.82	558,616.86	2,501,270.30
Yakima-Sunnyside	12,051.86	89,508.52	163,193.60	2,454,418.01
Yakima-Tieton	2,724.76	331,109.65	[1] 26,097.92	2,872,878.96
Wyoming: Shoshone	920.48	52,612.40	390,560.54	4,691,517.68
Total	85,960.13	2,110,433.87	4,780,345.72	105,780,306.30

[1] Deduct.

TABLE 11.—*Voucher transactions and net investments of the United States on secondary projects to June 30, 1917.*

State and project.	Debits.			
	Disbursement vouchers.		Transfers received.	
	Fiscal year 1917.	To June 30, 1917.	Fiscal year 1917.	To June 30, 1917.
Arizona:				
Little Colorado		$9,515.33		$40.00
San Carlos		24,589.74		252.67
San Pedro		2,423.72		3.97
Arizona well drilling	$2,134.70	2,134.70		
Arizona-California:				
Colorado River		42,235.20		7,160.38
Colorado River Basin	27,877.54	109,703.09	$2,458.75	12,765.59
California:				
Owens Valley		26,048.91		30.00
Sacramento Valley		52,808.13		2,748.07
San Joaquin		3,513.92		17.48
Iron Canyon cooperative		15,167.54		4,198.30
Pitt River cooperative	10.00	2,258.17		241.01
Shasta County cooperative	3.76	4,405.79		188.96
Lassen County cooperative		2,398.88		46.72
Imperial Valley	2,093.81	2,093.81	676.17	676.17
Kings River storage	768.60	768.60	389.10	389.10
Colorado: White River		4,348.04		9.11
Idaho:				
Dubois		21,464.03	23.15	858.13
Port Neuf		2,165.77		2.24
General investigations		496.55		695.23
King Hill	2,073.28	2,276.92	1,644.20	1,906.00
Swan Valley	544.48	544.48	.40	.40
Montana:				
Clark Fork		5,417.71		433.67
Crow Reservation		21,029.47		5.01
Lake Basin		7,044.39		79.87
Madison River		10,795.45		2.57
Marias		14,062.46		109.89
Nebraska:				
South Platte		1,913.96		963.05
Nebraska investigations		3,350.94		42.76
Pathfinder pumping		1,554.96		
Nevada: Walker River		13,643.22		53.15
New Mexico:				
La Plata		29,598.20		168.55
Las Vegas		5 012.16		2.23
Urton Lake		19,330.65		273.71
North Dakota:				
Bismarck		16,709.04		26.69
Little Missouri		11,665.59		1,709.00
Nesson		7,491.51		29,786.35
Washburn		9,951.90		1,973.89
Bowman		3,649.46		1,512.97
Oklahoma:				
Cimarron		8,725.96		321.76
Red River		59,413.75		1,902.64
Oklahoma reconnoissance		400.00		
Turkey Creek	137.30	137.30		
Oregon:				
Malheur		82,592.87		4,312.28
Central Oregon		43,014.03		1,767.04
Columbia River cooperative	526.50	14,996.05		7,010.18
Oregon cooperative	482.53	46,811.26	289.35	11,691.10
Texas: Pecos River investigation		7,498.21		427.81
Utah:				
Bear Lake		18,859.06		30.72
Utah Lake		34,044.67		9.25
Provo-Weber		141.35		
Washington:				
Benton		11,167.45		
Kittitas		19,366.90		
Wapato		36,445.06		20.71
Palouse		76,789.20		130.19
Palouse cooperative		9,394 00	134.80	3,164.48
Priest Rapids		6,218.98		247.58
Wyoming:				
De Smet		9,053.32		2.51
Wyoming cooperative	808.15	3,177.31	529.20	529.20
Wind River	2,280.22	2,280.22	87.30	87.30
Total	39,740.87	1,004,109.34	6,232.42	101,027.64

TABLE 11.—*Voucher transactions and net investments of the United States on secondary projects to June 30, 1917*—Continued.

State and project.	Credits.				Net investment.	
	Collection vouchers.		Transfers issued.			
	Fiscal year 1917.	To June 30, 1917.	Fiscal year 1917.	To June 30, 1917.	Fiscal year 1917.	To June 30, 1917.
Arizona:						
Little Colorado		$1.00				$9,554.33
San Carlos		12.90				24,829.51
San Pedro		.35				2,427.34
Arizona well drilling	$1,446.01	1,446.01			$688.69	688.69
Arizona-California:						
Colorado River		760.32		$4,925.26		43,710.00
Colorado River Basin	158.35	390.22	$655.68	2,181.08	29,522.26	119,897.38
California:						
Owens Valley		14,016.99				12,061.92
Sacramento Valley		91.79		11,843.69		43,620.72
San Joaquin		.20				3,531.20
Iron Canyon cooperative		9,045.43		540.96		9,779.45
Pitt River cooperative					10.00	2,499.18
Shasta County cooperative		2,450.00			3.76	2,144.75
Lassen County cooperative		500.00				1,945.60
Imperial Valley					2,769.98	2,769.98
Kings River storage					1,157.70	1,157.70
Colorado: White River		.15				4,357.00
Idaho:						
Dubois		1.81		5,068.29	23.15	17,252.06
Port Neuf						2,168.01
General investigations						1,191.78
King Hill					3,717.48	4,182.92
Swan Valley					544.88	544.88
Montana:						
Clark Fork		.25		269.90		5,581.23
Crow Reservation		1.90		2,120.62		18,911.96
Lake Basin				21.00		7,103.26
Madison River		1.85		67.08		10,729.09
Marias	40.00	41.55		632.20	[1] 40.00	13,498.60
Nebraska:						
South Platte						2,877.01
Nebraska investigations				12.00		3,381.70
Pathfinder pumping						1,554.96
Nevada: Walker River						13,696.37
New Mexico:						
La Plata		1,702.42				28,064.33
Las Vegas		.30				5,014.09
Urton Lake		1,225.51		914.15		17,464.70
North Dakota:						
Bismarck		14.70		3,099.34		13,621.69
Little Missouri		1.25		1,439.82		11,933.52
Nesson		4.14		19,801.89		17,471.83
Washburn		42.38		1,350.68		10,532.73
Bowman	287.90	1,410.50		1,091.09	[1] 287.90	2,660.84
Oklahoma:						
Cimarron				156.55		8,891.17
Red River		161.77		945.35		60,209.27
Oklahoma reconnoissance						400.00
Turkey Creek					137.30	137.30
Oregon:						
Malheur		279.80		3,134.73		83,490.62
Central Oregon		1,353.58		3,081.08		40,346.41
Columbia River cooperative		218.12		4,779.60	526.50	17,008.51
Oregon cooperative	20.48	886.21	14.00	7,607.49	737.40	50,008.66
Texas: Pecos River investigation		28.55		782.00		7,115.47
Utah:						
Bear Lake		62.06				18,827.72
Utah Lake		4.62				34,049.30
Provo-Weber						141.35
Washington:						
Benton	31.20	124.80			[1] 31.20	11,042.65
Kittitas						19,366.90
Wapato						36,465.77
Palouse		126.38		400.00		76,393.01
Palouse cooperative		24.77		2,331.79	134.80	10,201.92
Priest Rapids		250.55				6,216.01
Wyoming:						
De Smet		39.55		98.90		8,917.38
Wyoming cooperative		23.50			1,337.35	3,683.01
Wind River					2,367.52	2,367.52
Total	1,983.94	36,748.18	669.68	78,696.54	43,319.67	989,692.26

[1] Deduct.

TABLE 12.—*Voucher transactions and net investment of the United States on Indian irrigation and miscellaneous to June 30, 1917.*

Item.	Debits.			
	Disbursement vouchers.		Transfers received.	
	Fiscal year 1917.	To June 30, 1917.	Fiscal year 1917.	To June 30, 1917.[1]
Indian irrigation:				
Blackfeet project	$706.87	$926,133.17	.....	$109,379.18
Flathead project	11,783.21	1,540,484.10	.....	85,547.50
Fort Peck project	1,410.72	440,519.84	.....	40,897.01
Total	13,900.80	2,907,137.11	.....	235,823.69
Miscellaneous:				
General expense	487,706.89	3,756,448.34	$12,246.56	180,069.22
Preliminary investigations	.....	.....	.....	80,488.73
Jackson Lake enlargement	34,777.82	723,433.29	1,925.87	103,434.25
Total	522,484.71	4,479,881.63	14,172.43	363,992.20

Item.	Credits.				Net investment.	
	Collection vouchers.		Transfers issued.			
	Fiscal year 1917.	To June 30, 1917.	Fiscal year 1917.	To June 30, 1917.	Fiscal year 1917.	To June 30, 1917.
Indian irrigation:						
Blackfeet project	.....	$950,909.15	.....	$84,440.49	$706.87	$162.71
Flathead project	$10,805.73	1,577,264.93	.....	46,594.33	977.48	2,172.34
Fort Peck project	1,438.99	465,159.61	.....	16,188.60	[1] 28.27	68.64
Total	12,244.72	2,993,333.69	.....	147,223.42	1,656.08	2,403.69
Miscellaneous:						
General expense	47,021.87	94,425.59	$440,993.54	3,741,122.30	11,938.04	100,969.67
Preliminary investigations	.....	.....	.....	.....	.....	80,488.73
Jackson Lake enlargement	59,466.64	812,406.39	4,849.86	7,219.03	[1] 27,612.81	7,242.12
Total	106,488.51	906,831.98	445,843.40	3,748,341.33	[1] 15,674.77	188,700.52

[1] Deduct.

TABLE 13.—*Recapitulation of voucher transactions and all net investments of the United States from the reclamation fund to June 30, 1917.*

Item.	Debits.			
	Disbursement vouchers.		Transfers received.	
	Fiscal year 1917.	To June 30, 1917.	Fiscal year 1917.	To June 30, 1917.
Primary projects	$7,447,003.55	$119,533,642.57	$512,068.36	$5,383,851.63
Secondary projects	39,740.87	1,004,109.34	6,232.42	101,027.64
Indian irrigation	13,900.80	2,907,137.11	.....	235,823.69
Miscellaneous	522,484.71	4,479,881.63	14,172.43	363,992.20
Total	8,023,129.93	127,924,770.65	532,473.21	6,084,695.16

Item.	Credits.			
	Collection vouchers.			
	Miscellaneous.		Water-right charges.	
	Fiscal year 1917.	To June 30, 1917.	Fiscal year 1917.	To June 30, 1917.
Primary projects	$1,917,112.79	$9,256,385.32	$1,175,643.27	$7,770,368.71
Secondary projects	1,983.94	36,748.18	.....	.....
Indian irrigation	12,244.72	2,993,333.69	.....	.....
Miscellaneous	106,488.51	906,831.98	.....	.....
Total	2,037,839.96	13,193,299.17	1,175,643.27	7,770,368.71

Item.	Credits.		Net investment.	
	Transfers issued.			
	Fiscal year 1917.	To June 30, 1917.	Fiscal year 1917.	To June 30, 1917.
Primary projects	$85,960.13	$2,110,433.87	$4,780,345.72	$105,780,306.30
Secondary projects	669.68	78,696.54	43,319.67	989,692.26
Indian irrigation	.....	147,223.42	1,656.08	2,403.69
Miscellaneous	445,843.40	3,748,341.33	[1] 15,674.77	188,700.52
Total	532,473.21	6,084,695.16	4,809,646.70	106,961,102.77

[1] Deduct.

COLLECTIONS.

The two tables below give information as to collections that have been made under the reclamation operations. Table 14 gives an analysis of the sources of all cash collections to June 30, 1917, while Table 15 gives, by projects, the amount collected for water-right charges.

TABLE 14.—*Analysis of cash collections to June 30, 1917.*

Sources.	Fiscal years 1903–1916.	Fiscal year 1917.	Total to June 30, 1917.
Miscellaneous sales	$1,933,840.61	$463,958.02	$2,397,798.63
Miscellaneous services	4,428,000.80	185,189.25	4,613,190.05
Temporary water rentals	3,330,319.89	887,327.45	4,217,647.34
Power and light	1,040,524.57	462,992.40	1,503,516.97
Transportation refunds	305,102.27	33,321.75	338,424.02
Forfeitures by bidders and contractors	78,908.71	3,850.00	82,758.71
Water-right construction charges	4,146,630.35	650,094.56	4,796,724.91
Water-right operation and maintenance charges	2,448,095.09	525,548.71	2,973,643.80
Over disbursements	38,762.36	1,201.09	39,963.45
Total	17,750,184.65	3,213,483.23	20,963,667.88

TABLE 15.—*Collections of water-right charges by projects to June 30, 1917.*

State and project.	Construction charges.		Operation and maintenance.		Total.	
	Fiscal year 1917.	To June 30, 1917.	Fiscal year 1917.	To June 30. 1917.	Fiscal year 1917.	To June 30, 1917.
Arizona: Salt River		$100,000.00				$100,000.00
Arizona-California: Yuma	$5,827.66	276,612.92	$18,124.07	$79,214.40	$23,951.73	355,827.32
California: Orland	17,787.66	17,787.66			17,787.66	17,787.66
Idaho: Minidoka	59,629.53	501,412.21	73,725.49	384,185.11	133,355.02	885,597.32
Kansas: Garden City		142.50		104.50		247.00
Montana:						
Huntley	10,641.56	280,814.58	20,713.55	136,227.25	31,355.11	417,041.83
Sun River	13,271.12	115,956.48	7,297.53	49,704.97	20,568.65	165,661.45
Montana-North Dakota: Lower Yellowstone	34.07	35,906.27	7.84	36,801.81	41.91	72,708.08
Nebraska - Wyoming: North Platte	154,038.70	506,638.57	103,443.06	434,419.09	257,481.76	941,057.66
Nevada: Truckee-Carson	18,057.08	314,824.34	42,420.32	234,365.25	60,477.40	549,189.59
New Mexico: Carlsbad	19,935.94	160,304.83	21,938.89	161,755.38	41,874.83	322,060.21
North Dakota: North Dakota Pumping	1,037.77	9,095.82		13,307.15	1,037.77	22,402.97
Oregon: Umatilla	19,029.71	225,367.94	16,135.19	91,337.24	35,164.90	316,705.18
Oregon-California: Klamath	16,089.85	307,172.71	26,155.92	163,283.88	42,245.77	470,456.59
South Dakota: Belle Fourche	43,439.76	211,518.44	42,530.83	173,979.78	85,970.59	385,498.22
Utah: Strawberry Valley	28,531.45	48,359.32	13,947.34	19,076.57	42,478.79	67,435.89
Washington:						
Okanogan	59.64	24,682.19	798.55	37,093.44	858.19	61,775.63
Yakima storage	100,690.00	300,690.00	150.00	150.00	100,840.00	300,840.00
Yakima, Sunnyside	52,493.73	731,916.52	78,551.78	621,226.19	131,045.51	1,353,142.71
Yakima, Tieton	54,407.83	323,796.44	35,146.62	185,027.06	89,554.45	508,823.50
Wyoming: Shoshone	35,091.50	303,725.17	24,461.73	152,384.73	59,553.23	456,109.90
Total	650,094.56	4,796,724.91	525,548.71	2,973,643.80	1,175,643.27	7,770,368.71

TABLE 15.—*Collections of water-right charges by projects to June 30, 1917*—Continued.

State and project.	Refunds.						Net collection of water-right charges to June 30, 1917.
	Construction charges.		Operation and maintenance charges.		Total.		
	Fiscal year 1917.	To June 30, 1917.	Fiscal year 1917.	To June 30, 1917.	Fiscal year 1917.	To June 30, 1917.	
Arizona: Salt River							$100,000.00
Arizona-California: Yuma							355,827.32
California: Orland							17,787.66
Idaho: Minidoka		$234.10		$18.00		$252.10	885,345.22
Kansas: Garden City		142.50		104.50		247.00	
Montana:							
Huntley		603.59		96.97		700.36	416,341.47
Sun River		755.85		125.97		881.82	164,779.63
Montana-North Dakota:							
Lower Yellowstone							72,708.08
Nebraska-Wyoming: North Platte	$271.42	688.14		24.40	$271.42	712.54	940,345.12
Nevada: Truckee-Carson		210.00		42.00		252.00	548,937.59
New Mexico: Carlsbad							322,060.21
North Dakota: North Dakota Pumping		129.20		23.80		153.00	22,249.97
Oregon: Umatilla		63.00		9.55		72.55	316,632.63
Oregon-California: Klamath	1,241.50	1,427.50	$42.75	60.75	1,284.25	1,488.25	468,968.34
South Dakota: Belle Fourche		260.00		5.87		265.87	385,232.35
Utah: Strawberry Valley							67,435.89
Washington:							
Okanogan				52.50		52.50	61,723.13
Yakima storage							300,840.00
Yakima, Sunnyside	213.53	2,088.13		542.45	213.53	2,630.58	1,350,512.13
Yakima, Tieton		762.60				762.60	508,060.90
Wyoming: Shoshone		1,187.52		257.02		1,444.54	454,665.36
Total	1,726.45	8,551.93	42.75	1,363.78	1,769.20	9,915.71	7,760,396.00

RIO GRANDE DAM APPROPRIATION.

The three tables that follow give for the Rio Grande Dam appropriation information similar to that appearing in Tables 5 to 8, inclusive, with corresponding titles for the reclamation fund:

TABLE 16.—*Special appropriation for Rio Grande (Elephant Butte) Dam (34 Stat., 1357) to June 30, 1917.*

	Debit.	Credit.
Appropriation warrant No. 79, Mar. 4, 1907		$1,000,000.00
Disbursements, 2,896 vouchers	$1,000,091.78	
Collections, 24 vouchers		91.78
Total	1,000,091.78	1,000,091.78

TABLE 17.—*Balances of appropriations for Rio Grande (Elephant Butte) Dam with Treasurer of the United States, June 30, 1907, to June 30, 1917.*

Fiscal year.	Appropriation.	Withdrawals.	Balances.
1907	$1,000,000.00		$1,000,000.00
1908		$33,113.21	966,886.79
1909		137,074.22	829,812.57
1910		247,217.23	582,595.34
1911		327,875.96	254,719.38
1912		214,052.49	40,666.89
1913		39,165.89	1,501.00
1914		1,501.00	
Total	1,000,000.00	1,000,000.00	

TABLE 18.—*Disbursement and collection vouchers, appropriation for Rio Grande (Elephant Butte) Dam, paid and collected to June 30, 1917.*

Fiscal year.	Disbursement vouchers.		Collection vouchers.	
	Number.	Amount.	Number.	Amount.
Balance from Twelfth Annual Report	2,895	$998,590.78	24	$91.78
June 30, 1915	1	1,501.00		
Total	2,896	1,000,091.78	24	91.78

ADMINISTRATIVE ORGANIZATION.

U. S. RECLAMATION SERVICE.

Hon. Franklin Knight Lane, Secretary of the Interior.

Brig. Gen. William L. Marshall, United States Army, retired, consulting engineer to the Secretary.

Arthur Powell Davis, Director and Chief Engineer of the Reclamation Service.

Will R. King, Chief Counsel of the Reclamation Service.

WASHINGTON OFFICE.

Office of the director and chief engineer: C. J. Blanchard, statistician; E. C. Bebb, engineer; John H. Pellen, draftsman; F. L. Cavis, chief accountant; A. H. Gullickson and C. E. Piatt, examiners of accounts; C. H. Fitch, chief clerk; Hugh A. Brown, editor Reclamation Record; Emmet Carr, purchasing agent; A. H. Shellenberger, fiscal agent; G. W. Numbers, appointment clerk.

Office of the chief counsel: Law section: E. B. Hoffman, Geo. A. Ward, Ottamar Hamele, and E. W. R. Ewing. Land and general section: Morris Bien, counsel; O. G. Cowhick, D. H. Sibbett, J. E. Golladay, J. J. Fuller, Mrs. G. B. Mathiot, and Mrs. E. W. Ballard.

DENVER OFFICE.

F. E. Weymouth, chief of construction, Tramway Building, Denver, Colo.; R. F. Walter, assistant chief of construction; J. M. Gaylord, electrical engineer; D. W. Murphy, drainage engineer; J. L. Savage, designing engineer; James Munn, consulting engineer; E. A. Moritz, office engineer; A. McD. Brooks, purchasing agent; S. E. Hedden, disbursing officer; J. M. Luney, chief clerk.

OFFICE OF SUPERVISOR OF IRRIGATION.

I. D. O'Donnell, supervisor of irrigation, 206 State Bank Building, Billings, Mont.; Robert C. Elting, chief clerk.

FIELD OFFICES OF CHIEF COUNSEL.

Office of the assistant chief counsel, Denver, Colo.; H. L. Holgate, assistant chief counsel. Colorado River Water Right Investigations, assistant, H. D. Padgett.

Office of E. W. Burr, district counsel organization of irrigation districts, Denver, Colo., and general charge North Yakima division.

Denver, Colo.—E. E. Roddis, district counsel in charge; Armand Offutt, district counsel in charge contracts; J. J. Buck, assistant district counsel.

El Paso, Tex.—P. W. Dent, district counsel; Miss A. B. Preuss, assistant. Projects: Rio Grande, Carlsbad, and Hondo.

Los Angeles, Cal.—Oliver P. Morton, district counsel; D. G. Tyree, assistant district counsel; R. M. Patrick, assistant district counsel located at Fallon, Nev. Projects: Salt River, Yuma, Orland, and Truckee-Carson.

Portland, Oreg.—E. H. Peery and Lotus L. Langley, district counsel. Projects: Umatilla and Klamath.

North Yakima, Wash.—A. G. Pollock, district counsel. Projects: North Yakima and Okanogan.

Boise, Idaho.—B. E. Stoutemyer, district counsel. Projects: Boise, Minidoka, and Jackson Lake Enlargement.

Helena, Mont.—W. J. Egleston, district counsel; Mrs. Dell R. Raub, law clerk. Projects: Blackfeet, Flathead, Fort Peck, Huntley, Milk River, St. Mary Storage, Sun River, North Dakota Pumping, Lower Yellowstone, and Shoshone.

Scottsbluff, Nebr.—A. R. Honnold, district counsel; J. A. Dolphin, assistant. Projects: North Platte, Pathfinder Dam, Belle Fourche, and Lawton.

Montrose, Colo.—J. R. Alexander, district counsel; R. J. Coffey, assistant. Projects: Grand Valley, Uncompahgre Valley, and Strawberry Valley.

SOUTHERN DIVISION.

Rio Grande Project.—L. M. Lawson, project manager, El Paso, Tex.; H. J. Gault, engineer; Oro McDermith, irrigation manager; E. G. McCoy, chief clerk; L. S. Kennicott, fiscal agent.

Salt River Project.—W. S. Cone, project manager, Phoenix, Ariz.; Walter Ward, engineer in charge operation and maintenance; D. K. Clint, chief clerk and fiscal agent.

Yuma Project.—W. W. Schlecht, project manager, Yuma, Ariz.; R. M. Priest, superintendent of construction; R. S. Fessenden, irrigation manager; R. B. Smith, chief clerk; E. M. Philebaum, fiscal agent.

Carlsbad and Hondo Projects.—L. E. Foster, project manager, Carlsbad, N. Mex.; C. A. May, assistant project manager and fiscal agent; V. L. Minter, chief clerk.

PACIFIC DIVISION.

Boise Project.—D. W. Cole, senior engineer, Boise, Idaho; C. C. Fisher, engineer, E. R. Mills, chief clerk; C. F. Weinkauf, fiscal agent.

King Hill Project.—J. H. Miner, project manager, King Hill, Idaho; H. N. Bickel, chief clerk.

Minidoka Project.—Barry Dibble, project manager, Burley, Idaho; F. A. Banks, engineer; Dudley Pringle, chief clerk and fiscal agent.

Orland Project.—A. N. Burch, project manager; Orland, Cal.; C. H. Lillingston, chief clerk and fiscal agent.

Truckee-Carson Project.—J. T. Whistler, project manager, Fallon, Nev.; F. G. Hough, irrigation manager; J. R. Post, chief clerk and fiscal agent.

Umatilla Project.—H. D. Newell, project manager, Hermiston, Oreg.; M. D. Scroggs, superintendent of irrigation; C. H. Young, chief clerk and fiscal agent.

Klamath Project.—J. B. Bond, project manager, Klamath Falls, Oreg.; C. C. Hogue, chief clerk; E. V. Hillius, fiscal agent.

Yakima Project:

Storage Unit.—C. H. Swigart, construction engineer, Rimrock, Wash.; C. E. Crownover, assistant construction engineer; R. E. Post, superintendent of construction, in charge of Tieton Dam; W. L. Rowe, assistant engineer; L. G. Maney, logging superintendent in charge of construction at Meadow Creek, Wash.; N. K. Buck, chief clerk; W. D. Funk, principal clerk and fiscal agent at Meadow Creek, Wash.

Sunnyside and Tieton Units.—R. K. Tiffany, project manager, North Yakima, Wash.; R. K. Cunningham, chief clerk and fiscal agent; J. W. Gawler, special fiscal agent; J. G. Heinz, assistant manager, Sunnyside, Wash.; J. S. Moore, assistant engineer; C. F. Gleason, assistant engineer (pumping plant construction); G. C. Finley, superintendent of irrigation, Naches, Wash.

NORTHERN DIVISION.

Sun River Project.—C. P. Williams, senior engineer, Fort Shaw, Mont.; A. H. Ayers, engineer; C. A. Peavey, chief clerk; H. T. Caldwell, fiscal agent.

Huntley Project.—R. H. Fifield, project manager, Huntley, Mont.; C. A. Denman, chief clerk; R. L. Morgenweck, fiscal agent.

Milk River Project.—G. E. Stratton, project manager, Malta, Mont.; E. R. Scheppelmann, chief clerk; E. E. Chabot, fiscal agent.

St. Mary Storage Unit.—R. M. Snell, project manager, Browning, Mont.; L. V. Branch, engineer, Sherburne, Mont.; Frank Nivens, chief clerk; J. T. M. Culbertson, fiscal agent, Browning, Mont.

North Dakota Pumping Project.—W. S. Arthur, project manager and chief clerk, Williston, N. Dak.

Lower Yellowstone Project.—L. H. Mitchell, project manager, Savage, Mont.; J. C. Doubt, chief clerk and fiscal agent.

Okanogan Project.—Calvin Casteel, project manager, Okanogan, Wash.; H. A. Yates, chief clerk and fiscal agent.

Shoshone Project.—G. O. Sanford, project manager, Powell, Wyo.; C. M. Jump, superintendent of irrigation; R. R. Wright, chief clerk and fiscal agent.

Indian Projects:

Blackfeet Project.—R. M. Snell, project manager, Browning, Mont.; Frank Nivens, chief clerk and fiscal agent.

Flathead Project.—F. T. Crowe, project manager, St. Ignatius, Mont.; C. J. Moody, engineer; Harry Caden, chief clerk and fiscal agent.

Fort Peck Project.—R. M. Conner, project manager, Poplar, Mont.; G. H. Murphy, chief clerk and fiscal agent.

CENTRAL DIVISION.

R. F. Walter, senior engineer, Denver, Colo.

Grand Valley Project.—S. O. Harper, project manager, Grand Junction, Colo.; A. L. Collins, chief clerk; L. E. Nute, fiscal agent.

Uncompahgre Valley Project.—F. D. Pyle, project manager, Montrose, Colo.; J. H. Fertig, assistant engineer; E. R. Furstenfeld, chief clerk and fiscal agent.

North Platte Project.—Andrew Weiss, project manager, Mitchell, Nebr.; Paul Rothi, irrigation manager; J. R. Ummel, chief clerk; O. K. Barnes, fiscal agent.

Fort Laramie Unit.—O. T. Reedy, construction engineer, Fort Laramie, Wyo.; H. W. Bashore, principal assistant engineer.

Belle Fourche Project.—B. E. Hayden, project manager, Newell, S. Dak.; J. C. Counter, irrigation manager; J. H. Cuddy, chief clerk; August Lewin, fiscal agent.

Strawberry Valley Project.—J. L. Lytel, project manager, Provo, Utah; Ross Worsley, chief clerk and fiscal agent.

Colorado River Storage.—W. R. Parkhill, assistant engineer, Fallon, Nev.

Wind River and Angostura Projects.—C. T. Pease, engineer in charge investigations and surveys, Riverton, Wyo.

DISTRIBUTION OF EMPLOYEES.

Employees, June, 1917.

Office or project.	Educational.	Non-educational.	Others.	Total United States.	Contractors.	Grand total. Projects.	Grand total. Division.
Washington office	95	.....	8	103	.....	103	
Denver office	51	2	.....	53	.....	53	
Field offices of chief counsel	37	.....	.....	37	.....	37	
Billings office	2	.....	.....	2	.....	2	
Chicago office	1	.....	.....	1	.....	1	
							196
Southern division:							
Salt River	30	135	325	490	.....	490	
Yuma	12	139	304	455	.....	455	
Rio Grande	18	56	372	446	.....	446	
Carlsbad	3	17	102	122	4	126	
Hondo[1]	.....	.....	.....	.....	.....	.....	
							1,517
Pacific division:							
Orland	4	12	5	21	.....	21	
Boise (distribution and storage)	24	108	165	297	.....	297	
King Hill	2	.....	1	3	.....	3	
Minidoka	12	68	91	171	.....	171	
Truckee-Carson	10	36	68	114	.....	114	
Umatilla	10	27	49	86	.....	86	
Klamath	9	29	111	149	.....	149	
Yakima: Project office	14	.....	1	15	.....	15	
Storage unit	13	86	908	1,007	.....	1,007	
Sunnyside unit	9	61	97	167	.....	167	
Tieton unit	1	19	10	30	.....	30	
							2,060
Northern division:							
Blackfeet (Indian)	1	3	60	64	.....	64	
Flathead (Indian)	22	67	675	764	152	916	
Fort Peck (Indian)	5	5	54	64	.....	64	
Huntley	6	25	152	183	.....	183	
Milk River: Distribution unit	11	13	11	35	89	124	
St. Mary storage unit	11	19	156	186	.....	186	
Sun River	16	46	70	132	68	200	
Lower Yellowstone	3	7	21	31	.....	31	
North Dakota pumping	1	5	14	20	.....	20	
Okanogan	3	12	35	50	.....	50	
Shoshone	16	58	216	290	35	325	
							2,163
Central division:							
Grand Valley	12	34	92	138	8	146	
Uncompahgre Valley	13	50	70	133	.....	133	
North Platte: Interstate unit	12	75	198	285	.....	285	
Fort Laramie unit	16	78	65	159	310	469	
Belle Fourche	7	35	51	93	.....	93	
Strawberry Valley	10	36	35	81	1	82	
Colorado River storage	3	2	.....	5	.....	5	
Garden City	.....	.....	1	1	.....	1	1,214
Grand total, June, 1917	525	1,365	4,593	6,483	667	7,150	7,150
Grand total, June, 1916	507	1,154	3,749	5,410	672	6,082	6,082
Increase, 1917	18	211	844	1,073	−5	1,068	1,068

[1] Operation and maintenance of project transferred to water users, Apr. 1, 1917.

WAGES.

Approximate average daily wages, common labor, 1914–1917.

State and project.	1914		1915		1916		1917	Increase in 3 years.
	June.	Dec.	June.	Dec.	June.	Dec.	June.	
Arizona: Salt River	$2.00	$1.75	$1.90	$1.90	$2.15	$2.15	$2.25	$0.25
Arizona-California: Yuma	2.00	2.00	2.00	2.00	2.00	.200	2.40	.40
California: Orland	2.50	2.50	2.40	2.50	2.50	2.75	2.75	.25
Colorado:								
Grand Valley	2.25	2.40	2.31	2.50	2.50	2.50	2.65	.40
Uncompahgre Valley	2.12	2.25	2.61	2.50	2.50	2.50	2.50	.38
Idaho:								
Boise distribution unit	2.30	2.40	2.50	2.25	2.40	2.40	2.40	.10
Storage unit	2.50	2.50	2.50	2.50	2.50	2.50	2.75	.25
Minidoka	2.25	2.25	2.25	2.25	2.25	2.25	3.00	.75
Jackson Lake	2.50	2.50	2.50	2.50	2.50	2.50	2.75	.25
Montana:								
Huntley	2.50	2.50	2.24	2.45	2.25	2.75	2.75	.25
Milk River	2.50	2.65	2.60	2.70	2.80	2.80	3.00	.50
St. Mary storage unit	2.50	2.50	2.40	2.56	2.50	2.72	2.86	.36
Sun River	2.25	2.24	2.18	2.40	2.50	2.72	3.00	.75
Montana-North Dakota: Lower Yellowstone	2.25	2.35	2.25	2.40	2.25	2.75	2.75	.50
Nebraska-Wyoming:								
North Platte interstate unit	2.12	2.35	2.40	2.40	2.40	2.40	2.50	.38
Fort Laramie unit	.....	.....	.....	2.00	2.30	2.40	2.50	.....
Nevada: Truckee-Carson	2.20	2.50	2.50	2.50	2.50	2.50	2.75	.55
New Mexico:								
Carlsbad	1.50	1.50	1.50	1.63	1.63	1.76	1.76	.26
Hondo	1.76	1.76	1.76	1.76	1.76	1.76	1.76	
New Mexico-Texas:								
Rio Grande	1.25	1.25	1.50	1.50	1.58	1.50	1.75	.50
Elephant Butte storage	1.67	1.67	1.67	1.70	1.72	.....	.....	.....
North Dakota: North Dakota pumping	2.50	2.50	2.50	2.50	2.50	2.50	2.75	.25
Oregon: Umatilla	2.40	2.40	2.40	2.40	2.40	2.55	2.80	.40
Oregon-California: Klamath	2.48	2.48	2.48	2.48	2.50	2.50	2.72	.24
South Dakota: Belle Fourche	2.24	2.24	2.50	2.50	2.52	3.00	2.80	.56
Utah: Strawberry Valley	2.50	2.50	2.50	2.25	2.37	2.60	2.80	.30
Washington:								
Okanogan	2.50	2.50	2.20	2.20	2.20	2.60	2.80	.30
Yakima—								
Storage unit	2.20	2.20	2.60	2.20	2.60	2.80	3.00	.80
Sunnyside unit	2.20	2.00	2.00	2.20	2.20	2.40	2.60	.40
Tieton unit	2.00	2.20	2.20	2.20	2.40	2.60	2.75	.75
Wyoming: Shoshone	2.40	2.40	2.40	2.40	2.40	2.75	2.93	.53
Indian projects:								
Montana—								
Blackfeet	2.40	2.40	2.40	2.40	2.50	2.50	2.50	.10
Flathead	2.50	2.50	2.25	2.50	2.65	2.75	2.90	.40
Fort Peck	2.50	2.50	2.50	2.56	2.50	2.70	2.80	.30
Average	2.23	2.26	2.26	2.28	2.33	2.48	2.63	.40

It will be noted from the above table that the average wages for common labor have increased in three years from $2.23 per day to $2.63 per day—an actual average increase of 40 cents, or about 18 per cent higher wages than paid in 1914.

INJURIES.

Statement of injuries to employees of the United States Reclamation Service reported under the act of May 30, 1908.

Project.	Injuries reported.							Claims allowed.							Compensation paid.[1]							
	1908–10[2]	1911	1912	1913	1914	1915	1916	1908–10	1911	1912	1913	1914	1915	1916	1908–10	1911	1912	1913	1914	1915	1916[3]	Total.
Salt River	32	9	7	13	12	15	6	25	6	6	8	4	11	4	$10,859.26	$1,919.25	$798.00	$3,297.00	$1,340.75	$969.10	$2,124.25	$21,307.61
Yuma	68	46	51	18	19	19	19	33	27	26	11	15	14	15	5,084.02	2,424.93	10,740.79	1,591.55	2,775.26	3,914.08	5,321.37	31,852.00
Orland	3			3	2	2	1	1			1	1	1		613.00			67.28	45.00	42.50		767.78
Klamath	8	2	4		3	2	5	6		2		2	1	3	1,456.81	306.48	172.63		147.00	96.46	234.60	2,413.98
Grand Valley			8	44	113	44	5			3	16	66	25	1			177.92	2,398.72	9,175.94	2,885.56	120.00	14,758.14
Umcompahgre	71	11	8	12	17	1	2	51	6	1	7	9		1	17,190.69	1,468.79	62.33	1,333.92	562.69		109.38	20,727.80
Minidoka	17	5	7	4	9	7		14	6	2	3	6	6		3,443.10	253.75	1,066.70	1,339.00	667.86	594.60		7,365.01
Boise	17	66	118	94	197	68	21	12	10	76	70	144	62	7	1,538.76	2,403.66	17,035.09	14,338.82	23,997.39	11,829.75	964.45	72,107.92
Snake River storage	12	16		2	12	9		10	4		2	11	8		2,488.68	280.38		720.44	2,424.95	714.94		6,629.39
Garden City	3							1							77.46							77.46
Blackfeet (Indian)	5	1	2	3	8			5		1	2	2			1,700.40		52.20	195.85	252.96			2,201.41
Flathead (Indian)	12	19	9	9	5	2		3	7	5	4	2	1		665.75	1,541.38	481.11	366.91	118.12	30.00		44.16
Fort Peck (Indian)					1							1							44.16			3,203.27
Huntley			2	1	5	1	4			2	1	4	1	1			77.50	72.50	250.81	208.34	186.75	795.90
Milk River	11		3	6	14	3	1	7		1	1	9	2	1	1,302.87		47.10	39.60	888.08	83.80	205.83	2,567.28
St. Mary storage	1	2	4	7	7	29	5	1	2		6	4	7	4	49.87	316.58		445.43	956.83	447.00	2,782.25	4,997.96
Sun River	2			15	2	4	5	2			6	2	1		665.76			1,927.00	83.92	198.00		2,874.68
Lower Yellowstone	25		9	2	2	1	1	10		2	1	2	1	1	3,077.35		145.12	129.94	77.62	299.25	52.25	3,781.53
North Platte	11	10	12	11	7	5	4	7	8	5	10	4	3	1	1,391.88	2,676.66	2,829.16	1,453.08	1,137.78	172.70	44.80	9,706.06
Truckee-Carson		8	15	12	11	8	6		5	9	8	8	8			314.95	2,266.45	860.40	1,232.20	964.97		5,638.97
Carlsbad			1			4	2			1			2	1			33.00			642.41	469.50	1,144.91
Rio Grande	3	54	94	79	117	62	7	2	23	41	36	74	54	6	87.19	1,049.70	2,465.71	3,754.88	8,955.74	8,901.88	1,459.50	26,674.60
North Dakota pumping	13	2		7	6	1	4	4	1			2	1		333.50	601.21			101.86	39.00	297.25	1,392.82
Umatilla					4	14	4					1	1	2					78.00	81.60	624.00	783.60
Belle Fourche	4	3	1	4	1	4	3	2	3			1	3		998.40	192.36			40.32	330.53		1,561.61
Strawberry Valley	32	33	54	7	2	7	1	6	19	21	4	1	4		1,717.10	4,512.88	4,136.56	1,225.85	988.00	246.40		12,826.79
Okanogan	3							3							360.75							360.75
Yakima	71	39	28	41	47	70	30	25	13	9	22	18	27	14	5,297.87	3,773.77	750.88	2,031.23	1,876.82	3,019.45	2,946.67	19,696.69
Shoshone	11	2	17	20	12	9	1	5	2	12	8	10	6	2	439.10	140.40	3,685.85	611.59	589.79	499.89	883.06	6,849.68
Jackson Lake enlargement							7							7							516.32	516.32
	435	328	454	414	635	391	137	235	42	225	227	403	250	71	60,859.57	24,177.13	47,024.10	38,200.99	58,809.85	37,212.21	19,342.23	285,626.08

[1] Payments do not include cost of hospital and medical service, or subsistence, or cost of employment of other persons in place of those injured.
[2] From Aug. 1, 1908, to Dec. 31, 1910.
[3] Payments not completed for injuries received in 1916.

ENGINEERING ARTICLES RELATING TO THE WORK OF THE SERVICE.

The following is a partial list of engineering articles relating to the work of the Reclamation Service as published in engineering and technical journals. The list is printed for the information of engineers and others interested in the work and is a continuation of the list printed on pages 776 to 782 of the fifteenth annual report. Lists 1 and 2 are available for free distribution.

GENERAL ARTICLES.

Results of stream measurement of U. S. G. S. (with diagrams). F. H. Newell, Trans. Amer. Inst. Min. Eng., Oct., 1891. (Issued also as a separate, 29 pages.)

Suggestions for the irrigation of western lands to procure employment and homes for the laboring people of the United States. Frank Foley, Chicago, 1894. 20 pp.

Weather Bureau cooperation in reclamation work. F. H. Brandenburg, Monthly Weather Review, Sept., 1903, vol. 31, pp. 414–415 (Address before the 11th National Irrigation Congress, Ogden, Utah, Sept. 15, 1903).

Reclamation of the West. F. H. Newell, National Geographic Magazine, Jan., 1904, vol. 15, pp. 15–30.

The Reclamation Service. F. H. Newell, Popular Science Monthly, Dec., 1904, vol. 66, pp. 107–116.

The work of the Reclamation Service, illus. F. H. Newell, Smithsonian Annual Report, 1904, pp. 373–381.

Our gigantic irrigation work. Country Calendar, June, 1905, vol. 1, pp. 117–118.

Object lesson in irrigation. C. J. Blanchard, Review of Reviews, June, 1905, vol. 31, pp. 701–704.

Uncle Sam's romance with science and soil. Arena, Jan., 1906, vol. 35, pp. 36–46.

Government as homemaker. Hamilton Wright, World Today, Feb., 1906 vol. 10, pp. 156–163.

The Eden makers; some remarkable things the United States Reclamation Service is doing. J. W. Helburn, American Illustrated Magazine, Mar., 1906, vol. 61, pp. 493–505 (illustrated article).

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